



1 SEP 1947

SCIENCE NEWS LETTER



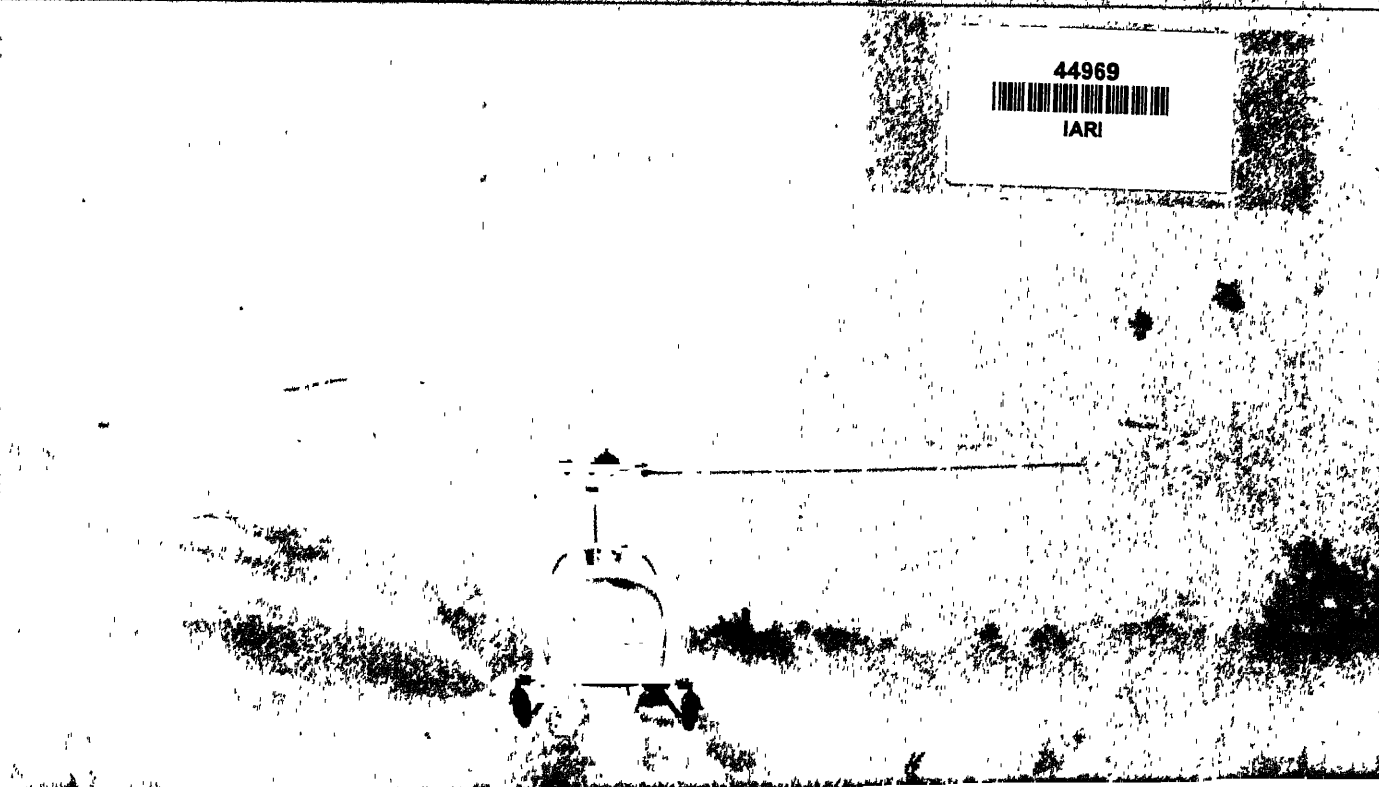
Vol. 82, No. 1

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JULY 5, 1947

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A SCIENCE SERVICE PUBLICATION



Commercial shipping on the high seas and inland waterways is now freed by radar from delays caused by bad weather.

RCA Radar—enables ships to see through

***fog
darkness
storms***

With shipboard radar, developed and produced by engineers of the Radiomarine Corporation of America—a service of RCA—a pilot watches a viewing screen (similar to a television screen) that shows a clear, maplike picture of the area under observation.

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RADIO CORPORATION of AMERICA

ANTHROPOLOGY

Oldest Mexican To Visit

Bones of Tepexpan man are now in Washington for reassembly and study. Possibly oldest inhabitant of western hemisphere yet found.

► THE BONES of the oldest Mexican yet discovered, Tepexpan fossil man, have just arrived in Washington for reconstruction and study at the Smithsonian Institution.

When the anthropologists get the prized skeletal material assembled, we shall have a good picture of the kind of early human beings who hunted prehistoric elephants or mammoths on a Mexican lake beach not less than 10,000 and not more than 15,000 years ago.

After traveling to Washington in a suitcase, escorted by Dr. Javier Romero of the Mexican National Museum of Anthropology, the Tepexpan man bones, discovered in February, will be compared with the remains of other famous early men in the U S National Museum collections in charge of Dr. T. Dale Stewart.

These old bones may prove to be one of the classic discoveries of early man. Tepexpan man may be the oldest inhabitant of the western hemisphere yet found.

Dr. Hellmut De Terra, anthropologist for the Viking Foundation in New York, with Dr. A. V. R. Arellano of Mexico's Geological Institute and Dr. Hans Lundberg, Canadian geophysicist, made the discovery by using electrical prospecting apparatus to spot likely places to dig.

Even before the bones of Tepexpan man are fitted together, a picture of this early human can be sketched roughly. His bones are remarkably complete. Only his backbone, his hip bone except for a fragment, and his feet were missing when he was found lying among the bones of five mammoths, extinct ice age animals.

Dr. De Terra visualizes his ancient protégé as having a broad nose, somewhat pinched at the bridge, not very prominent cheek bones, a high domed skull and a short head, not quite what the scientists call brachycephalic.

You could meet someone who looks like Tepexpan man in parts of Mexico today, probably his descendants, just as there are people in the Dordogne region of France today, with a similar and prob-

ably have Cro-Magnon man as their ancestors. In the famous primitive village of Tepoztlan, near fashionable Cuernavaca south of Mexico City, people have been picked by Dr. Henry Field, American anthropologist, whose skull types might pass for Tepexpan man.

Tepexpan, where the earliest Mexican was found, is a little town that thousands of Americans have motored through northward from Mexico City on their way to the famous pyramids of Teotihuacan, built over a thousand years ago by prehispanic Indians who are almost modern compared with Tepexpan man.

No tourists stop to see the muddy-water-filled pits from which the famous bones have come. The site is unmarked. The rainy season has stopped search for skeletons. Now it is time the scientists are writing their reports and assembling their bones.

In a few months Tepexpan man, reassembled skeletally and his bust sculptured by a famous artist, will hold receptions in Washington and New York so that the modern world may have a glimpse of the human past. Then he will be brought back to the land of his birth to take his place among Mexico's cultural treasures.

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GENERAL SCIENCE

World Faces Shortage Of Teachers of Science

► ALTHOUGH industries, colleges and secondary schools are demanding more science teachers, only three out of each 1,000 teachers of tomorrow are preparing to become science teachers.

This serious situation, revealed by a survey of 18 of America's largest teacher-training institutions made by Prof. Fletcher G. Watson of the Harvard Graduate School of Education, is causing concern in scientific, governmental and industrial circles.

Out of 120,000 teachers-in-training, only 307 are specializing in either science or mathematics, Dr. Watson found.

Many science teachers in both high schools and colleges left their class-

ATOM SPLITTING—This photographic autograph made by a speeding atom particle is possible because of a newly developed photographic plate super-sensitive to the electrical charges carried by atoms and relatively insensitive to light and X-rays. The length and curvature of the track and the grain-spacing along it tell the scientist about the particle's speed, energy and other characteristics. Thus the particle can be identified as a proton, alpha particle, or heavily charged nucleus. The new plates are the work of scientists in the laboratories of Eastman Kodak Company.

rooms during the war to join the armed forces or undertake technical tasks in production and research. Many did not return and the influx of GI and other students added teaching loads. Schools and colleges as a result are still understaffed in comparison with prewar conditions, and they are asked to carry a much heavier load.

Adding to the danger in the situation is the realization that it takes at least six years for a capable 18-year-old to train himself for effective scientific research. Estimates show that the loss to science personnel due to the war was 150,000 undergraduates who would have been granted bachelor's degrees in science and technology. Some would have gone on for doctoral degrees training to carry on original research. Now there is a shortage of 3,375 Ph. D. scientists, with the figure expected to climb to 16,870 by 1955.

Dr. Watson warns that our future voters may have less comprehension of the function of science in our civilization.

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CHEMISTRY

Makes Paints Stick

Thin layer of plastic less than thousandth inch helps in painting metal and gives better protection. Other reports from chemistry meeting.

➤ A THIN layer of plastic, less than a thousandth of an inch thick, will make paints stick better to a metal surface and give longer, more effective protection to the surface.

The coating, which is called a wash primer, is polyvinyl butyral resin, to which is added an insoluble zinc chromate pigment and phosphoric acid. L. R. Whiting of the Bakelite Corporation described the plastic to the Midwest Regional Meeting of the American Chemical Society in Kansas City, Mo.

He explained that the coating is applied to a metal surface to give temporary protection before painting and to make the paints stick to the surface better. A big advantage of the new plastic wash primer is that it produces good results in temperatures ranging from below freezing to the heat of midsummer.

Best test of the coating came on the bottom of a boat, Mr. Whiting reported. The boat ran aground after six months' service and some of the paint film was torn off. After 18 months in salt water, there was no corrosion from water getting into the coating from the break in the surface of the film.

The plastic will increase the effectiveness of most types of paint, but it performs best with a special vinyl plastic paint over the wash primer, Mr. Whiting said.

The new coating can be applied on any of the common metals, he told the chemists.

Soapy Chemical Protects

➤ A SOAPY chemical, described as similar to synthetic soaps, can help protect steel pipes and other equipment used in oil refining and drilling from strong acids, P. H. Cardwell and L. H. Eilers of Dowell, Inc. told the meeting.

They explained that when acids are used to eat out passageways in rock or remove rust scale from oil equipment, certain chemicals are added to protect the steel from corrosion by the acid. Newest method of preventing damage to the steel is to add a soapy chemical to the solution.

The inhibitors, as the protective chemicals are called, stick to the surface of the steel. They are bound to the metal by atoms of nitrogen, sulfur and oxygen, the chemists said. Best inhibitors are compounds with large molecules, tests have shown.

More Glycerine

➤ PRODUCTION of glycerine, important ingredient of cosmetics and explosives which comes mainly from fats, reached an all-time high of 69,000,000 pounds during the first four months of 1947. This represents an increase of almost 25% over the same period last year, N. N. Dalton of the Glycerine Producers' Association reported.

Mr. Dalton pointed out that glycerine is an important by-product of soap-making. It is surprising, he noted, that production climbed to this record peak, since the manufacture of synthetic soaps which yield no glycerine is increasing.

So far, declared Mr. Dalton, no economical synthetic process for making glycerine has been found. It will probably continue to come from fat-splitting industries for many years, he predicted.

Glycerine, he explained, is a substance of contradictory qualities. Although it is one of the best known solvents, some of its chemical combinations are practically insoluble. In high explosives it has taken many lives, yet it is used in medicine as a mild heart stimulant and in antiseptic dressings.

Glycerine is put on the skin of the new-born baby and is used to embalm the dead.

Better Anti-Knock

➤ BETTER anti-knock gasoline can be produced by vaporizing the gas and straining it through common aluminum ore, two chemists disclosed.

G. M. Brooner and C. J. Helmers of the Phillips Petroleum Company, Bartlesville, Okla., explained that vaporizing the gasoline and straining it through

bauxite crystals removes the sulfur impurities which cause knocking in your car engine. Bauxite is the ore from which most aluminum comes.

The aluminum-bearing ore turns the knock-causing sulfur into hydrogen sulfide gas, the unpleasant smelling vapor which you can whiff from rotten eggs.

Gasoline which has been strained through the bauxite crystals requires less tetraethyl lead, anti-knock compound that is now scarce, the chemists reported.

The new process removes from 75% to 95% of the sulfur from distilled, or straight run, gasoline and from 40% to 60% of the sulfur from gas cracked from petroleum.

Octane number, one measure of the

SCIENCE NEWS LETTER

Vol. 52

JULY 5, 1947

No. 1

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C. North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5866, and 380 N. Michigan Ave., Chicago, State 4499.

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quality of gas, is increased by the new straining process.

Bauxite used in straining the gas becomes contaminated with carbon deposits, but a single batch of the ore will treat from 5,000 to 15,000 barrels of fuel. The cost is less than one cent for each barrel.

Oil From Safflower Seed

➤ OIL FROM safflower seed can help ease the shortage of linseed oils for paints and varnishes and may give Midwestern farmers a new cash crop, Harry Miller of the chemurgy project of the University of Nebraska reported.

When refined, the safflower seed oil is practically colorless and produces as good drying properties in paints as the best grade of linseed oil, Mr. Miller said. He declared safflower oil forms a film superior to that of linseed oil. White paints made with safflower oil show no tendency to turn yellow.

In India, where a million acres of safflower are raised each year, the thistle-like blossom is used to make a yellow dye. The leaves are used in salads and the oil is used for food.

A new variety of safflower which contains 35% oil has been developed at the Nebraska Chemurgy project, Mr. Miller stated. Still higher oil content varieties may be developed with seed from imported safflower, he predicted.

Bone Marrow Stores Fat

➤ FAT stored in the bone marrow is readily available for use in the body, Dr. H. E. Newlin, of the Midwest Research Institute, told the meeting.

Much of the fat that is eaten goes directly to the bone marrow, where it is kept in reserve until it is needed by the body, he explained. The bones, he continued, can store as much as one-fifteenth of the entire body fat, or roughly one-third as much as the liver, another important fat-storing organ.

Dr. Newlin pointed out, however, that fat stored in the liver, muscles and brain is evidently not affected at once by a change in diet.

Describing tests on rabbits, he said that they were fed in four stages: 11 to 12 days on a normal diet; 12 days on a low-fat diet; 14 days on a diet extra rich in fat and another 14 to 21 days on a restricted diet.

The first period gave a normal basis for comparison. Just after the second

stage, the bone marrow showed a greatly reduced fat content, he reported, showing that the body draws quickly on this fat reserve.

The diet enriched with cottonseed oil caused a sharp rise in bone fat, whereas the results after the final feeding period showed that the rabbits were again drawing on fat stores in the bone marrow.

Dr. Newlin noted that the amount of fat in the marrow, as well as the kind, was found by its tendency to combine with iodine. The so-called iodine number decreased during periods on low-fat diet and increased during stages of fat-enriched feeding, giving a value near that of cottonseed oil.

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AGRICULTURE

Perique Tobacco Grows Only in Ten-Mile Stretch

➤ PERIQUE, a strong, flavorsome, black tobacco, will grow only in a 10-square-mile stretch of southern Louisiana. It is used in many domestic tobaccos as flavoring and, in normal times, in British and French pipe tobaccos. It can be cultivated only on the east bank of the Mississippi around Convent, La Place and Lusher, La.

A curious thing about perique is that burley, bright or any other tobacco can be imported into the small perique coun-

try—and by its second year it comes up perique. Transplanted back to Virginia or another tobacco country, it does not thrive.

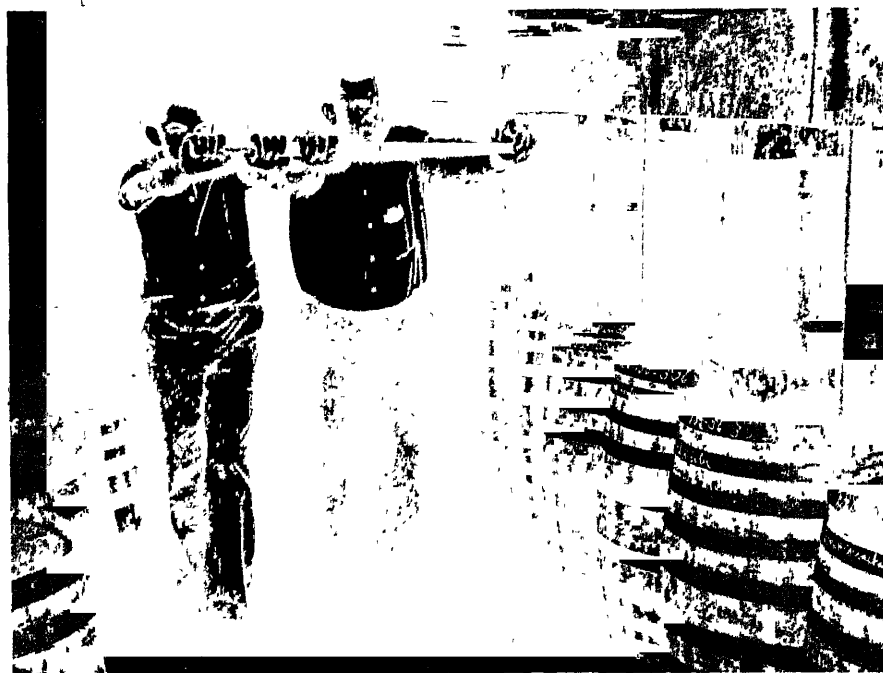
Agricultural specialists have no explanation for this. The soil of perique country, although rich alluvial Mississippi river mud, tests out identically with soil on the Mississippi's west bank, where perique cannot be grown.

The "Cajun" growers of Louisiana's tiny perique belt are classed as both planters and manufacturers of tobacco. Their warehouses in which perique is cured by a process antedating Columbus, must be bonded by the U. S. government.

Perique curing is essentially a process of fermentation. The "torquettes" or twists are placed in a barrel and pressed hard. Juice which is thus forced from the leaves is allowed to bathe the tobacco for several weeks. Then the twists are removed, exposed to air for a short time, and put back under more forced pressure. This process is repeated three times. Tobacco harvested in September is ready for market by January or February.

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The hoe is still the best weed-killer for ordinary home gardens; the chemical weed-killer 2,4-D is effective in destroying broad-leaved weeds in the lawn but is equally effective in killing tomatoes, beans and peas in the garden.



HAND WORK—Perique tobacco is cured by the old-fashioned method of pressing by hand.

PLANT PHYSIOLOGY

Chlorophyll Studied

Atomic pile product, radioactive carbon, useful in advancing knowledge of key to life. Making food from sun and water is two-step process.

➤ RESEARCH that produced the deadly atom bomb is already working in the opposite direction by producing a better knowledge of the green key of life itself. Using radioactive carbon of atomic weight 14, generated in the atomic pile, two University of California chemists, Dr. A. Benson and Dr. M. Calvin, have shown for certain that chlorophyll, the green pigment in plants that lays the foundation of all foods, does its work in a two-stage process, and that one of these stages can be carried on in the dark.

This does not render false the old statement that chlorophyll makes food out of water and carbon dioxide with the energy of sunlight. Some of the solar

energy is simply stored, and is available afterwards for use in the dark.

The research also demonstrated that the raw materials, water and carbon dioxide, are not turned immediately into the finished products, sugars and starches, as plant physiologists a generation ago thought might be the case. The radioactive carbon atoms turned up first in several intermediate compounds, including succinic, fumaric and malic acids, long known to be present in plants.

Following reactions step by step, Drs. Benson and Calvin have been able to diagram the whole process. This diagram, with a brief technical discussion of their results, is published in *Science* (June 20)

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PHYSICS

Need Civilian Support

"Pure science" research on the mesatron is necessary to find how atom nucleus is held together but even the giant equipment used should be paid for by civilians, physicist believes.

➤ "BULKY metal monsters" and other scientific equipment are being used to search out the secret of what holds the heart of the atom together, but this work should be paid for by civilian funds and not by the Armed Forces or the Atomic Energy Commission, an atomic scientist stated.

A particle called the mesatron, which is produced by the cosmic rays bombarding our atmosphere from outer space, may hold the key to the stability of the atomic nuclei, Dr. Edward Teller of the University of Chicago explained in the Bulletin of the Atomic Scientists. But Dr. Teller is worried about who is to foot the bill for this research.

Money for building atom-smashers and laboratories and paying scientists now comes "with comparative ease" from only two sources, the Armed Forces and the U. S. Atomic Energy Commission, he pointed out.

"It is the business of neither to support pure research," Dr. Teller declared.

"We should be grateful for their help which must tide American science over until our public and our lawmakers realize more fully the importance and the proper place of science in our life," he added.

Dr. Teller did not advocate by name a national science foundation such as is called for in legislation which passed the Senate and is now in a committee of the House of Representatives. But he argued, "If we want to have progress and power tomorrow, we must let the men who love science and truth play today."

The "play" of scientists, he explained, includes the study of the mesatron. Unlocking the secrets of the mesatron, also called the meson by some scientists, may not mean more comfort or power, he warned. However it will increase our understanding of nature.

"This, to a physicist," Dr. Teller added, "is a matter of supreme importance."

Tools for the attack on the mesatron include the famous cyclotron, the syn-

chrotron, a combination of the two called a synchro-cyclotron, the betatron and the linear accelerator, the scientist said.

Study of the mesatron with these "bulky metal monsters" may revise our thinking on the smallest pieces of matter, Dr. Teller suggested. Particles we call elementary may be broken down into even smaller particles.

We may learn much more about the bits of matter which make up the earth by studying particles from the cosmic rays which come to us from outer space.

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PLANT PHYSIOLOGY

Carbon Action Rapid

➤ CARBON ATOMS do not linger long in the first-formed compounds into which they are built by green plants. Within the first hour, they can be found not only in these first simple acids and sugars, but also in the more elaborate molecules of celluloses, lignins, carotinoid pigments, amino acids and proteins.

These facts of plant life have been discovered by four scientists in University of California laboratories. They used radioactive carbon 14, made in atomic piles at Oak Ridge, to replace ordinary carbon 12 in the carbon dioxide which is the starting-point of all food-making by plants.

This radioactive carbon dioxide was "fed" to barley seedlings in glass-topped chambers, with electric light substituted for sunlight. After an hour's exposure, the plants were plunged into liquid nitrogen to freeze them instantly, then ground to powder and separated into 12 classes of compounds. Tests for radioactivity showed that the C¹⁴ atoms had been taken into the structure of all 12, though to varying degrees.

The research was conducted by Drs. S. Aronof, A. Benson, W. Z. Hassid and M. Calvin. Details are published in *Science* (June 27).

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FOOD TECHNOLOGY

Dried Fruit Paste Made

➤ FROM REHOBOTH, in troubled Palestine, comes a method for making dried fruit paste in leathery sheets, later to be soaked up and prepared for the table. The outer rind is grated off citrus fruits, the rest ground to pulp and dehydrated. A little of the grated rind may be returned for flavoring if desired. This procedure, developed by Zdenka Samisch, is protected by patent 2,422,588.

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METEOROLOGY-PUBLIC HEALTH

Flood Problems Remain

Even after waters have receded, communities must combat threats to health in drinking water supplies, breeding places of disease-carrying flies, etc.

➤ FLOOD TROUBLES will not be ended when the rivers recede into their normal channels and displaced populations have scrubbed the mud out of their houses and hosed it off their sidewalks and streets. Some quite serious problems in health and sanitation will require attention all the rest of the summer.

Necessity to protect city water supplies is obvious, and the cleanup and chlorination programs are for the most part well taken care of as soon as reoccupation of flooded pumping stations is possible. But many bottomland farmsteads depend on wells. The water left in these after inundation is unsafe, and the wells should not be used until they have been pumped empty and thoroughly cleaned.

Insects, especially flies and mosquitoes, will complicate the disease situation. Ponds and puddles left behind as flood

waters recede will greatly increase the number of possible breeding-places for mosquitoes, and hence boost the incidence of malaria unless they are promptly drained or given an oil-and-DDT treatment. Fortunately, treatment of such temporary bodies of water is of no significance so far as fish are concerned, so no protests will be heard from wildlife interests.

Flies will present an even more difficult set of problems. Their ordinary breeding and feeding places — farm manure piles, city garbage dumps, open privies — will in many instances have been swept away by the waters. Their dangerous contents will have found lodgment in the innumerable masses of debris, which flies will unerringly find. Some of the filth will be mingled with the ill-smelling mud deposited by the stagnating water, especially behind pro-

tective levees that may have to be breached to let it out. Carcasses of drowned animals may not be located by human searchers, but blowflies will spot every one of them, whether big as a cow or small as a kitten, and will breed in the decaying flesh.

Both houseflies, which breed in filth, and blowflies, which breed in carrion, also like to hang around human habitations, crawling over food and investigating milk-bottles. Both classes of flies are capable of carrying typhoid fever, diarrhea and the dysenteries. Therefore all communities that have suffered flooding, or are located near flooded areas, need to blanket themselves with DDT spray or fog, as one essential means of protecting their people against insect-borne diseases.

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SEISMOLOGY

Navy Builds Seismographs To Record Man-Made Blasts

➤ HELGOLAND ceased to be a fortress nearly two months ago, but echoes of the blast of 4,600 tons of high explosive are still reverberating in scientific circles. At a meeting of the Seismological Society of America on the campus of Fordham University, two groups of scientists from the U. S. Naval Ordnance Laboratory in Washington, D. C., told of this man-made earthquake and of the instruments used in recording its effects. B. Perkins, Jr., of the Office of Naval Research, headed the group who told of the explosion itself, J. V. Atanasoff headed the team that demonstrated the special instruments.

There were 18 of these instruments all told, set up at 10 stations on a line across Europe from the German coastal town of Cuxhaven to Gorizia, Italy, near the head of the Adriatic.

The instruments had to be more sensitive than those commonly used by oil and mineral prospectors, yet they had to be more portable than the heavy yet delicate seismographs of permanent observatories. So a compromise was worked out.

Each instrument consisted of a pendulum "standing on its tail," its motion controlled by light springs attached to its upper end. Slight movements caused a flickering of a very small electric current, which after amplification in an electronic hookup actuated the recording mechanism.

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FLOOD STUDY—The U. S. Army Air Forces photographers are taking pictures like this of flood areas to aid in evaluating flood control measures. About 2,000 to 3,000 photographs are taken daily. These can be fitted together to form mosaic maps.

BACTERIOLOGY

Plague Can't Be Used In Bacteriological War

➤ YOU CAN scratch plague, the "Black Death" of the Middle Ages, off your list of horrors to be feared if nations ever start fighting each other with germs as well as atom bombs and more ordinary weapons.

Removal of plague from the list of bacterial warfare agents is implied by the discovery that streptomycin, earth mold chemical, is effective against the most deadly form of plague.

Streptomycin controlled pneumonic plague in 90% of mice given the chemical, Dr. Karl Meyer, University of California epidemiologist, announced.

"There is every reason to believe streptomycin will be equally effective in man if given early in the attack of plague," he stated. "The findings indicate the last threat of this disease has been removed in modern nations."

Plague is still a routinely occurring disease in China and India.

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AGRICULTURE

Quackgrass Conquered by New Chemical Powder

➤ QUACKGRASS, long unconquerable, has at last met its Waterloo. A British-originated chemical, isopropyl-N-phenyl carbamate, shortened for convenience to IPC, has been used experimentally at the U. S. Department of Agriculture's great experiment station at Beltsville, Md., near Washington, with such promising results that it can be recommended for general use.

In the Beltsville experiments, conducted by John W. Mitchell, P. C. Marth and L. W. Kephart, the chemical was applied as a fine, dry powder at rates of from five to 60 pounds per acre, using sand as a carrier. Even at the lowest rate the quackgrass growth was first checked, and finally it died completely.

First effect noticed was stoppage of growth of new shoots from the stolons or runners that are the plant's most effective means of spreading. Later the runners themselves die. It is not a quick-acting poison, but it seems to be deadly sure.

IPC seems to be a kind of opposite number to 2,4-D. Like 2,4-D, it belongs to the large group of organic compounds that act as growth hormones in small quantities, but kill plants in higher concentrations. Whereas 2,4-D

kills broad-leaved plants but is harmless to most grasses, IPC is a grass-killer but has not harmed the broad-leaved plants on which it has thus far been tried.

It is not a kill-all for grasses, however. Certain weed grasses, such as crabgrass, appear to be immune to it.

Because far less work has been done on IPC than on 2,4-D, the Department of Agriculture scientists recommend reasonable caution in using it. It seems to have no ill effects on human beings or domestic animals, but they believe it is just as well to play safe until more is known about its possible toxicity.

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CHEMISTRY

Plastic Floor Cover Requires No Waxing

➤ A NEW floor covering that requires no waxing and polishing was displayed in New York at the combined furniture and floor covering manufacturers' show of new materials and styles.

It is a plastic flooring, made of vinylite material, and is a product of Delaware Floor Products, Wilmington, Del. It will be known under the trade name of Flor-Ever; production will begin this month.

It is claimed to combine linoleum's advantages with ease of laying, greater flexibility, resistance to wear, lack of porosity, resistance to chemicals, ease of cleaning, as well as the elimination of the need of waxing.

Because the material used is a vinylite plastic, it will not chip or crack. Designs run through the entire thickness of the wearing material. Its waterproof felt back makes it easy to lay.

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AGRICULTURE

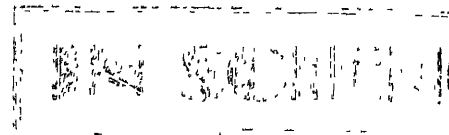
Don't Make Tracks That Create Moisture in Hay

➤ MAKE HAY while the sun shines, but don't make tracks in it by driving or walking over freshly mown hay is the latest advice to farmers.

If you walk or drive over the freshly mown hay, Prof. H. D. Bruhn of the University of Wisconsin agricultural engineering department explains, it creates dense areas of moisture, because freshly cut hay has about 80% moisture content.

Dense areas prevent air from circulating through the hay. If the air doesn't circulate in the fresh hay, it spoils.

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PHOTOGRAPHY

Eastman Home to House Photographic Institute

➤ A NEW institute, planned as a world historical center for photography, is being established in the home of George Eastman, American photographic pioneer, who died in 1932.

The Eastman House, which since his death has served as the home of University of Rochester presidents, will contain the largest and most complete photographic collection in the world.

The institute, announced jointly by the University of Rochester and the Eastman Kodak Company, is expected to be in operation within two years.

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NUTRITION

Japanese Go Whaling To Relieve Food Crisis

➤ JAPAN'S renewed Antarctic whaling activities, which have provoked British and Australian protests, are motivated primarily by Japan's dire need for meat. The Japanese whalers do not take their oil home; they sell it, and it presumably finds its way eventually to European tables as margarine. But the meat they process and take home as food.

Whale meat has little appeal to the Occidental palate. It has been described as tasting "like coarse beef boiled in spoiled codliver oil." But in a war-ravaged country that is chronically only a half-jump ahead of famine it is acceptable.

Part of the reason for the British-Australian protest against Japanese whaling is believed to be based on the claimed inefficiency of oil extraction on the two Japanese factory ships. Figures on record indicate that in Jap hands a blue whale unit yields on an average only about 85 barrels, as against 110 barrels per unit obtained by British whalers, and 116.5 barrels by the Norwegians.

In allocating permitted catches, the unit of measurement is the blue whale, largest of whale species. A blue whale unit is equal to two finback whales or six sei whales, smallest of the Antarctic whales.

Science News Letter, July 5, 1947

WEAPONS

AERONAUTICS-AGRICULTURE

Special Model Helicopter For Dusting of Crops

See Front Cover

➤ NEW WEAPON for laying down a barrage against insect enemies is the helicopter made especially for crop dusting shown on the front cover of this week's SCIENCE NEWS LETTER.

Because of the low speeds possible with the helicopter, it is possible to lay the agricultural dust at any desired rate—or to hover in one spot for special attention to a heavily infested area. No need to go back to the airport for re-loading with dust; the helicopter can land on any reasonably level area that is free of obstructions for 45 feet.

The new crop duster is being used in Argentina to battle the hordes of locusts invading that country. It has also been used against the gypsy moth in New England cranberry bogs where DDT has reportedly made a 100 per cent kill.

Science News Letter, July 5, 1947

ENGINEERING

New Demolitions Tape Saves Tedious Figuring

➤ A DEMOLITIONS tape which measures an object in pounds of explosive needed for blasting instead of in inches and feet has been developed by the U. S. Army Corps of Engineers. (*The Military Engineer*, June.)

The new tape will be a big time-saver for engineers. When blasting timber, steel, concrete or some other material, the engineer would measure it with an ordinary tape. Then, using his measurements, he would work out the several steps of mathematical formulas to determine how much explosive to use. Or maybe he just guessed the amount of explosive needed for the job.

Now, with the new tape, the engineer can measure the object and read the number of pounds of explosive to use right off the tape.

The tape consists of two different tapes with four sides. There are sides for masonry and concrete, concrete beams, steel and timber. Each scale is adjusted to the type of material. In addition to

the number of pounds of explosive needed, the tape has standard directions for blasting different types of materials.

Idea for the new demolitions tape came from Lt. John E. Nickols of the Engineering School two years ago. He heard GIs back from overseas declare:

"No, I didn't use the formulas to calculate my charges, I just used a hell of a lot of explosives."

To meet the need for a quick, simple means of finding out how much explosive was needed for blasting an object, Lt. Nickols suggested the demolitions tape. He and Capt. William B. Sinnickson, assistant chief of the demolitions branch of the Engineer Board, developed the tape.

The tape, which gives the answers to the formulas, is a sort of direct-reading slide rule for blasting operations.

Science News Letter, July 5, 1947

MEDICINE

Sensitivity Returning To Skin Can Be Measured

➤ A DEVICE for measuring returning sensitivity to skin areas whose nerve supply has been cut by war injuries or accidents is covered by patent 2,422,520, granted to Dr. S. H. Bartley of Dartmouth Medical School. A mounting somewhat like that of a microscope applies an electrically controlled stylus to the skin area to be tested. "Plus" or "minus" responses are recorded on a sheet of paper, at spots indicated by an automatic light-carrying pointer.

Science News Letter, July 5, 1947

INVENTION

Wind Tunnel Device Tests Dust-Storm Resistance

➤ IF NOT the proverbial tempest in a teapot, then at least a sealed-in sand-storm, is provided by the machine on which patent 2,422,179 was issued to L. A. Brewster of Dayton, Ohio. It is intended for testing machines and other things that are to be used in regions where sand and dust storms occur. Essentially, it is a windowed box containing a small wind tunnel with a hopper that delivers sand or dust into the blast before it strikes the test object. Special care has been taken to prevent leakage to the outside or the fouling of bearings, etc., with destructive grit. Rights are assigned royalty-free to the government.

Science News Letter, July 5, 1947

ANTHROPOLOGY-CHEMISTRY

Chemical Analysis May Show Age of Ancient Bones

➤ CHEMICAL analysis may reveal the age of ancient bones, which have been buried perhaps thousands of years.

Dr. S. F. Cook, physiologist, and R. F. Heizer, anthropologist, both of the University of California, base the new method on analyses of 42 bone samples removed from various locations in the lower Sacramento Valley in California. These bones are known to come from different ages in California's prehistory.

In older bones, the average amount of nitrogen, the element which also makes up four-fifths of the air we breathe, was much less than in more recent specimens. The ratio of calcium to phosphorus became greater as the age of the bones increased. Phosphorus, an element important for healthy teeth, had gradually formed soluble compounds and been washed away.

Although the foods eaten by these prehistoric people, as well as the soil in which they were buried, might also have had some influence on the analyses, the scientists considered the time element by far the most important.

A previous estimate had dated the earliest of these bones at about 5,000 years ago. But the new method, reported in the *American Journal of Physical Anthropology* (June), indicated that they may be some 11,000 years old. The scientists said archaeologists should study the possibility of a greater age of the bones.

Science News Letter, July 5, 1947

SEISMOLOGY

Pacific Bottom Shaken By Strong Earthquake

➤ THE PACIFIC ocean bottom near the northern Marianas, 600 miles north of Guam, was shaken by a strong earthquake June 19. Seismologists of the U. S. Coast and Geodetic Survey, using data transmitted by Science Service, fixed the epicenter at latitude 22 degrees north, longitude 143 degrees east, and time of origin at 3:24.5 a.m., EDT.

Observatories reporting were those of the U. S. Navy at Guam, of the Jesuit Seismological Association at Georgetown, Fordham and St. Louis universities, and of the U. S. Coast and Geodetic Survey at Tucson, Ariz.

Science News Letter, July 5, 1947

MEDICINE

New Hayfever Weapons

Three chemicals to join the relief methods now in use. Will take another season to evaluate them. Attacking weeds is another approach.

By JANE STAFFORD

➤ MOST of the nation's 3,000,000 hayfeverites, whether they know it or not, will be playing the role of scientific guinea pigs this summer. Many of them are going to have a happier, less sneezy summer than ever before.

The reason: Chemists have developed a number of weapons for fighting the annual crop of sneezes, sniffles and general misery that starts with the first wind-tossed tree pollens in March and drags on until frost kills off the ragweed in the late fall.

Chief of the new chemicals are pyribenzamine, antergan also called 2339 RP, and benadryl. Any day now, there may be some others, because chemists and drug manufacturers are still busy creating new anti-hayfever and anti-allergy weapons.

Pyribenzamine, antergan and benadryl (sorry, but those are the simplest names for them) were tried to some extent last summer. They had previously been tested on relatively small groups of patients with hayfever and other allergies. These tests showed the new drugs to be pretty effective. From 82% to 95% of the patients were said to have had their symptoms relieved. Doctors and patients were enthusiastic. Then came the ragweed season. Ragweed can cause more trouble than practically any other substance that causes hayfever or other allergies.

The new drugs did not give relief to the extent observed in the studies on small groups of persons, states the editor of the *Annals of Allergy*, official journal of the American College of Allergists.

Mild Cases Aided

Hayfever patients with mild symptoms got good results but these patients are often relieved by sedatives, hot drinks or rest.

"Some patients with a moderate amount of hayfever have done well but the results are not consistent," the editorial continues. "Some days the drugs have blocked symptoms, other days there has been no response. This has probably

been due to the fact that there is a tendency to great fluctuation in the pollen counts. When they are high, more drug is necessary, and when they are low, less is necessary; but if the patient forgets to make this decrease in dosage, then side reactions are apt to occur. This feature alone makes use of the drug impracticable in some individuals.

"Severe cases of hayfever benefit very little from the anti-histaminic drugs. Often there is a tendency to increase the dosage until levels twice those recommended are reached. These large amounts of benadryl and pyribenzamine are apt to cause side reactions in so many instances that a recent study, which will soon be published, reveals that four out of every five subjects had unpleasant results leading up to a discontinuance of the drugs."

The unpleasant side reactions were nausea, vomiting, headaches, disorientation and drowsiness. About one-fourth of the patients had such trouble with the drugs. As a result, there is considerable confusion as to the merits of the drugs and the basis for their use, the editor points out.

Confusion Explained

Some of the confusion comes from the fact that the drugs were introduced as anti-histamine chemicals. The theory behind this is that the primary cause of allergic reactions, such as hayfever, hives and so on, is the release of histamine, a chemical normally present in body tissues. Authorities do not agree on this theory, and some question whether pyribenzamine and benadryl give relief because of their anti-histamine actions or because of some other action, such as their sedative effect.

"One ray of hope" is offered by the editor of the *Annals of Allergy*. This is to combine the new drugs with the old-established desensitization or immunization method of treating hayfever. By this method, patients are given tiny, gradually increasing doses of an extract of the pollen that causes their hayfever. The idea is to get their bodies used to the offending substance before the season

starts. Most patients with mild and moderately severe hayfever are helped by this. The ones with more severe hayfever often are not. They are so sensitive to the ragweed pollen that when the desensitizing doses are increased, they get severe reactions to them and not enough can be given to finish the desensitizing job. Benadryl and pyribenzamine, however, control these reactions. So they might be used to help make the desensitizing procedure a success even for patients with severe hayfever.

It will take another hayfever season or two, the *Annals of Allergy* editor states, before the new drugs are finally evaluated. So hayfeverites this summer can expect to be guinea pigs for this evaluation, and many of them will probably be relieved of much of their misery in the process.

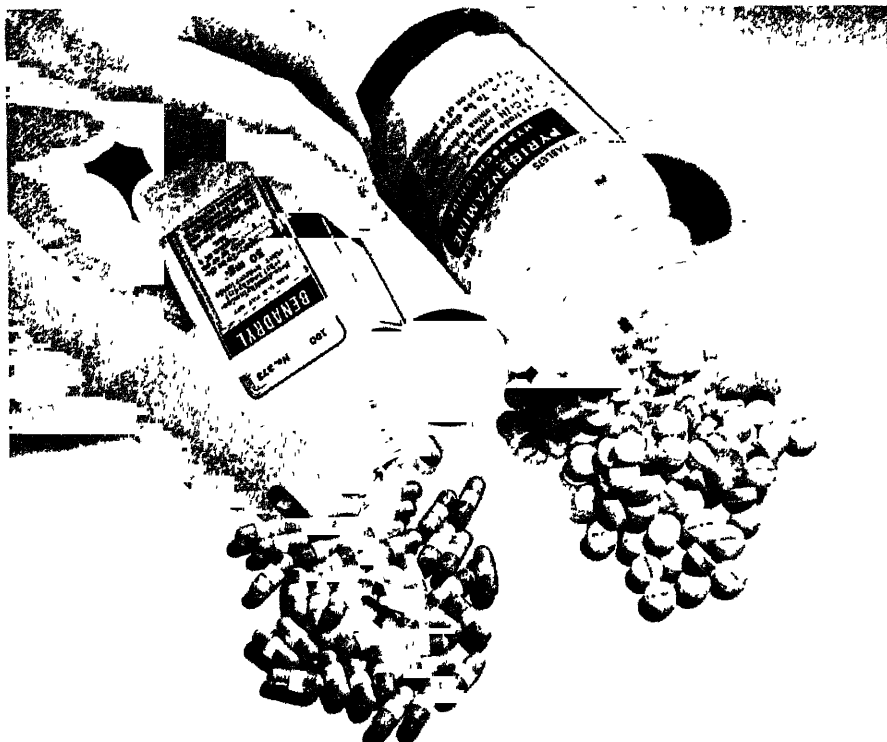
Treat Weeds

Giving the chemicals to the weeds instead of the patients is another modern way of fighting hayfever, particularly the kind due to ragweed. This is one of the peacetime benefits we can have from our biological warfare research which included potential chemical warfare on food crops as well as germ warfare on humans and domestic animals.

The new weed-killer, 2,4-D, which was studied in these researches, can be a peaceful weapon to free millions of hayfever sufferers now and in the future. All that is necessary is to lay down a fog of this chemical on roadsides, empty lots and other areas infested with ragweed, the chief cause of hayfever. The fogging, when done at a very early stage of flower development, will kill the plants before they shed any pollen.

While this is a measure for community hayfever fighting, there are a number of things the hayfever sufferer can do and avoid doing which will add to his comfort during the pollen season. His doctor will tell him about these, but repeating them here may help patients who are forgetful.

Before the desensitization treatments were used, hayfever sufferers found their only relief by going away during the pollen season to regions free of the troublesome pollens. Those who had to stay at home found that it helped to keep doors and windows closed. Undisturbed by drafts and breezes, the pollen



FOR HAYFEVER—New hope for relief of the misery of hayfever is offered by these two new drugs—benadryl and pyribenzamine.

grains settled to the floor and caused less trouble. Mechanical devices in windows to filter the pollens out of the air of the patient's sleeping room are also helpful, enabling him at least to get a sound night's sleep. Filters like those used in modern gas masks should be helpful.

Hayfever sufferers should keep away from drafts and be careful how they use electric fans, not only because these blow the pollen grains about but because of their chilling effect on the body. The ability to react to chilling processes is altered in hayfever sufferers. In them, loss of body heat causes an abnormal swelling of tissues in the nose, with consequent constant sniffing and sneezing. People who do not have hayfever may occasionally experience this sneezing or stuffiness of the nose after a sudden drop in temperature, for example on going into an air-cooled store or theater on a hot day. To the healthy person the nose stuffiness, if he does feel it, is only a temporary and minor discomfort. To the hayfever sufferer it may mean 24 or 48 hours of severe discomfort. Air-conditioning, which keeps the air free of pollens, will help the hayfever sufferer, but air-cooling is likely to cause trouble. Electric fans should not blow directly on the hayfeverite and should not be used

to cool the air to the point of chilling the body.

Iced drinks are also likely to cause trouble for hayfever sufferers because of their chilling effects. Hot drinks, on the other hand, are recommended by one authority who states that they are especially helpful when taken soon after awakening in the morning.

Science News Letter, July 5, 1947

CHEMISTRY

Plasticized Punch-Cards For Business Machines

➤ SINCE TREMENDOUS volumes of business and statistical operations are transacted by automatic machines that respond to holes, notches, etc., in punch-cards, it is essential that these keep their original dimensions. To prevent paper's liability to alignment-destroying shrinking, swelling and warping, Dr. H. M. Kvalnes of the Du Pont Experimental Station, Wilmington, Del., impregnates it with methylol urea, a thermoplastic resin, then "sets" it by pressure and heat. Patent 2,422,423, issued on his formula, is assigned to his employing firm.

Science News Letter, July 5, 1947

Seven states require that pasteurized milk be used in making cheeses.

AGRONOMY

Worms Need Blankets To Keep Out Winter

➤ WORMS need blankets to keep them from getting killed by sudden cold spells. This doesn't mean that the worms are applying for relief, they earn their livings and are decidedly worth keeping on the farm.

Earthworms, as Darwin first pointed out long ago, improve both chemical and physical conditions in the soil. So a large, healthy worm population is a good thing for any farm to have.

Dr. Henry Hopp and Paul J. Linder of the U. S. Soil Conservation Service have been trying to do something about the decline in earthworm populations of fields that is especially bad when clean-cultivated crops, such as corn, are being grown. They found that the biggest numbers of earthworms congregated under the grassroots in sodded fields.

Any kind of surface protection seemed to encourage the worms. Under a mulch of mowed lespedeza, a member of the clover family, a sampling indicated an earthworm population of 1,610,000 per acre. Soybean stalks and leaves were also good protection. Second-best was common burlap sacking. It sheltered 995,000 worms to the acre.

Science News Letter, July 5, 1947



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Do You Know?

A thin protein film of the gelatin type is now being applied to glass fiber *yarns* as they are formed; this makes it possible to dye the yarns with ordinary dyes.

Avocado trees, the fruits of which are known as alligator pears, were brought from Nicaragua to California 90 years ago, although little was done to establish commercial growing for many years.

There are about 400,000 *oil wells* in the United States and they produce 4,800,000 barrels daily; the average production per well is therefore about 12 barrels.

Butcher birds, also called shrikes, catch insects or small mammals and impale them on the thorns of such trees as the Osage orange or honey locust until they need them for food.

Pure de-gassed *iron* can effectively be used to replace molybdenum and nickel in the construction of electrodes and other metal parts of electron tubes, according to the U. S. Department of Commerce.

Eclipses of the sun are still greeted in parts of the world with noisy religious services to frighten away the monster devouring the sun.

On exhibit at Stanford University, California, is the shell of a giant *clam* weighing 300 pounds and an oyster shell a foot long.

Bamboo clumps rarely bear seed until many years after planting; new clumps are usually started by dividing old ones.

How to buy a FARM

"Too many mistakes are made in buying farms," is the opinion of our staff of farm managers charged with the management of hundreds of farms, ranches and plantations. At today's inflated prices of farm land, the number will be much larger.

OUR YARDSTICK in buying a farm consists of five main points. Professional advice on "How to Buy a Farm" and pitfalls to avoid are covered in detail in a report prepared by the DOANE AGRICULTURAL SERVICE, the oldest and largest farm management and appraisal service in the United States; editors of the widely read "Doane Agricultural Digest" and "Doane Rural Appraisal Handbook". This report contains material from both of these services.

If you are interested in buying a farm or want to check up on the farm you own, send \$1 for "How to Buy a Farm".

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RESOURCES

Coal Strike Would Hurt

Would not only mean chilly homes next winter, but would result in delay of recovery in Europe and consequent need for U. S. assistance.

➤ A COAL strike now or during the rest of the year, coupled with the growing shortage of fuel oil, would mean uncomfortable homes next winter.

It means also a further delay in the recovery of Europe—and a continued need of American dollars for food for the destitute in the devastated countries.

European recovery depends upon a supply of coal for factory power. European coal mines are as yet far from normal production. America is now sending overseas some 2,500,000 tons of coal a month. It may be years before Europe again can supply its own fuel needs. Without fuel, industry is at a standstill. When European labor is again receiving regular wages, the need for American free food will no longer exist.

Present stock piles of coal in the United States are satisfactory under normal conditions. During the year to date some 300,000,000 tons have been mined. This production equals top wartime mining. However, the season is close at hand when northern factories must lay in stockpiles for the winter months and when foresighted home-owners put in their winter supplies.

The present threatened fuel oil shortage is not a matter of strikes. It is due largely to increased use without new refineries and transport facilities to meet the increased demand. Enough crude oil can be mined to meet the needs of the coming months, but the necessary new refineries will not be ready for many months.

The increased demand for petroleum products is double headed. More automobiles are on the road and they need more gasoline. One automobile manufacturer states that the average car will be driven 1,000 miles farther this year than last. To meet increased demands for gasoline, the petroleum industry is "cracking" crude more closely, which leaves less for fuel oil.

Meanwhile, fuel oil consumption is increasing. Diesel engines are coming into far wider use than formerly. More trucks, tractors, power shovels and buses are diesel-powered. Diesel locomotives are becoming more common. One reason for the increased use of diesels in power-

plants is to get away from a fuel shortage due to coal strikes.

During the coming winter many more homes than ever before will want oil for heating. It is estimated that with installations made this year the number of oil-heated homes is 50% greater than in 1945. Makers of equipment are urging installations, but the oil industry is reported to be suggesting a delay because of a possible fuel shortage.

Fuel oil for the eastern states may be more plentiful than in the central areas. Transportation to the Atlantic coast area is largely by ocean tankers. To the Midwest, it is largely by pipelines. The eastern supply will depend upon the continuation in service of government-owned tankers operated by private oil companies. The matter rests with the government.

Pipelines to the Midwest from Oklahoma and Texas oil fields, even at full capacity, can not meet the expected demands of the coming months. One Midwestern company has already announced plans to allocate its available gasoline to dealers in proportion to deliveries before this year's increased demand arose.

Railroad transportation could help the Midwest situation if sufficient tank cars were available to handle cartage from oil fields to refineries, and handle also distribution from refineries to the thousands of centers to which petroleum products must now travel by rail.

Science News Letter, July 5, 1947

AERONAUTICS

Major Gardner Awarded Guggenheim Medal

➤ MAJOR Lester D. Gardner, publisher and aviation leader, has been awarded the 1947 Daniel Guggenheim Medal for achievement in the advancement of aeronautics.

Major Gardner, a veteran of the first World War, organized the Institute of Aeronautical Sciences and was chairman of its council until his retirement this year. The award particularly cited Major Gardner for his role in the Institute.

Science News Letter, July 5, 1947

PSYCHIATRY

Epilepsy Can Be Cured

This disease presents a challenge to doctors. Four drugs can successfully fight epilepsy, and four fifths of those suffering with it could be cured.

► A CHALLENGE to doctors to rescue the victims of a "forgotten disorder" was issued by Dr. Frederick A. Gibbs of the University of Illinois College of Medicine at the meeting in Chicago of the American College of Physicians.

The "forgotten disorder" is epilepsy. It is as important a disease as tuberculosis or diabetes. Half a million persons in the United States suffer from it. Four-fifths of them could be perfectly well all the time if they were given one of the four "exceedingly useful" drugs now available for treatment of epilepsy.

But most doctors are not interested in treating epilepsy, Dr. Gibbs charged. A large number of the patients are given a "run-around." They are referred to this, that and the other specialist and end up in the hands of non-medical practitioners or "members of the medical profession who are on the lower fringe of competence."

The four useful drugs for controlling the fits and seizures of epilepsy are dilantin, phenobarbital, which is a sleeping medicine, mesantoin and tridione. The first three give good results in the kind of epilepsy called grand mal. Patients with this form of the disease have convulsions or fits. But these three drugs are not for the patient with petit mal epilepsy, who does not have fits but has brief periods of "absence."

During these momentary but often frequent periods, the patient does not know what is going on. He may not faint but apparently is "out," though persons around him may not notice the

seizure. For these patients the new drug, tridione, gives good results. Tridione, however, makes grand mal epilepsy worse. So doctors must recognize the type of epilepsy the patient has and treat him accordingly.

A third type of epilepsy rarely responds to treatment. This is called psychomotor epilepsy. In this type, the patient is confused and though he temporarily loses his memory, he usually is not unconscious.

"His general manner," said Dr. Gibbs, "is that of a person acting in a bad dream."

A characteristic brain wave record appears only when the patient is asleep. It shows even when the patient is sleeping under the influence of powerful sedative and sleeping drugs.

Science News Letter, July 5, 1947

ORDNANCE

Latest Airborne Weapon Is Howitzer on Parachute

► LATEST AIRBORNE weapon of the Army is the 75 millimeter howitzer, weighing 2,240 pounds, which has been successfully lowered to the ground using a series of two ribbon parachutes.

The ribbon parachutes, introduced by the Germans during the war, have been developed for heavy duty from high altitudes for the Army Ground Forces and Air Forces by engineers of the Air Materiel Command at Wright Field.

Record-breaking drop of the howitzer from an AAF C-82 transport plane was

made with a small 14-foot parachute to pull the cargo out of the rear doors of the plane. This small extraction chute is trailed behind the plane, and pulls the howitzer out of the plane when released by a mechanism in the fuselage.

As the artillery piece is pulled from the plane, a huge 90-foot parachute is opened to lower the cargo to the ground. The howitzer is believed to be the heaviest equipment ever lowered from a plane without damage.

The Germans thought their wartime experiments with the ribbon chutes showed that the top altitude from which they could be used was 150,000 feet, but instruments have been safely lowered from 360,000 feet from a captured V-2 rocket fired recently at White Sands, N. Mex., by Army Ordnance.

In earlier Army experiments, tests were made from a height of 180,000 feet with an Army WAC Corporal rocket.

The howitzer is placed on a wooden skid in the plane and can be loaded in 15 minutes.

Science News Letter, July 5, 1947

Expecting?

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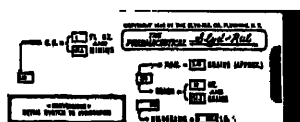
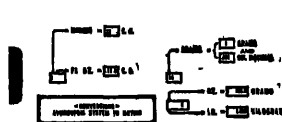
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Land Alive!

➤ THAT "dirt under your feet", of which you are accustomed to think as the lowermost thing in the scale of values, is vitally necessary to you, if only because the things that come out of it keep you alive. Without it you could not eat, or clothe yourself, or live in a house, because from the earth beneath come, directly or indirectly, all food, all fiber, all timber and bricks and building stone.

But the soil is not only vitally necessary, it is vital in itself. It literally swarms with life; so much so, that of some soils at least it can be fairly said they are alive. Indeed, if each living entity is counted as one life, (and why not?) one single grain of soil may well be more alive than a whole apartment house full of human tenants—there are many times more individual organisms on it.

You will not see much of this soil life without a microscope. A handful of soil that has had plants growing in it may show a few root fragments, a few seeds, two or three small ants, perhaps an earthworm or a white grub, and if you

look very closely a number of tiny mites or other lesser many-legged creatures that scuttle into crevices to shun the unfriendly light.

But if someone who knows how to coax microorganisms away from their wonted homes gets to work on the soil, what a metropolis of hidden tiny life he will turn up eventually under his microscope! There will be innumerable bacteria of a dozen or more distinguishable kinds, nearly as many different kinds of fungi, very likely a few slime-molds, and near the surface some cells of green or blue-green algae. These represent the plant kingdom. The animal kingdom will be well represented, too, with swarms of protozoa and considerable numbers of nematodes or roundworms. There are

also many spores, eggs, larvae and other propagative and resting stages of both plant and animal life.

These swarming populations of every spoonful of fertile soil work sometimes together, sometimes against each other, even as men and tigers, crop plants and weeds, trees and toadstools and other living things in the familiar visible world. Some bacteria and fungi return dead things to the soil, enriching it with nitrogen, phosphorus and humus, others as hungrily devour and dissipate this wealth. Some of the slime-molds and protozoa and nematodes are harmless, others attack roots and cause destructive plant diseases. It takes a lot of knowing, to tell friend from foe down there in the invisible dark.

Science News Letter, July 5, 1947

MEDICINE

Q Fever Holds Questions

➤ HERE'S A Q story. It has some queer, even quaint features, but Q is the name of a disease Q fever. Just that. The Q stands for question mark.

Q hit 55 stockhandlers, slaughterhouse workers and trainmen in Amarillo, Texas, killing two of them, in March, 1946. The 55 did not know what had hit them. Neither did their doctors. That is not queer, because it was the first naturally occurring outbreak of the disease in the United States. Previous outbreaks in this country had been in laboratories among scientists working with the germs and in troops who got the disease while overseas. The second naturally occurring outbreak struck about 30 packinghouse workers in Chicago last summer. (See *SNL*, Oct. 19, 1946.)

Drs. Norman H. Topping and Charles C. Shepard, with Dr. J. V. Irons and J. N. Murphy, Jr., of the Texas State Health Department and Dr. John M. Hooper of the Amarillo Health Department and Dr. Don M. Wolfe of Lederle Laboratories, Pearl River, N. Y., studied the history of the outbreak, the records of the illnesses and the blood serum of the patients. They report in the *Journal of the American Medical Association* that the disease was definitely Q fever and that the patients probably got it from cattle. The cattle themselves did not seem to be ill or to have anything the matter that could be detected while they were being handled in the stockyards at auction and in the packing house.

There is no specific treatment for the

disease. Penicillin and sulfa drugs were tried in Amarillo, but the doctors do not think these had any effect. PABA (short name for para aminobenzoic acid) might help, because it has been effective in other diseases caused by the same kind of germs. These germs are named rickettsia for an American scientist, Howard Taylor Ricketts, who first discovered this kind of germ, though not the Q fever rickettsia. PABA was not tried in Amarillo because the disease was not identified until the outbreak was all over.

Science News Letter, July 5, 1947

PHYSICS

Atomic Energy Power Felt in Magazine World

➤ ATOMIC power may not be turning wheels in industry yet, but the magazine publishing business is about to get a test of the money-power of the atom.

A new magazine, announced for publication in September and devoted to atomic matters, will command an annual subscription fee half again as much as the high-class monthly, *Fortune*. The new magazine will be called *Nucleonics*. It is described by the publishers as "The McGraw-Hill Magazine of Nuclear Technology."

Dr. John R. Dunning, Columbia University nuclear physicist, will serve as consulting editor of *Nucleonics*, which will be edited by Keith Henney, consulting editor of the magazine, *Electronics*.

Science News Letter, July 5, 1947

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THE AMERICANA ANNUAL An Encyclopedia of the Events of 1946—A. H. McDannald, ed.—*Americana Corp.*, 800 p., illus., \$10 A compilation of information concerning outstanding developments in all branches of knowledge

APPROACHES TO GROUP UNDERSTANDING—Lyman Bryson, Louis Finkelstein, R. M. MacIver, eds.—*Conference on Science, Philosophy, and Religion*, 858 p., \$5 The Sixth Symposium of the Conference on Science, Philosophy, and Religion in Their Relation to the Democratic Way of Life

ARCHAEOLOGY OF THE HIGH WESTERN PLAINS SEVENTEEN YEARS OF ARCHAEOLOGICAL RESEARCH—Eugene B. Renaud—*Univ. of Denver*, 135 p., paper, \$1.70 Dealing exclusively with the work of the Department of Anthropology of the University of Denver, it is a summary of their work presenting the main features of the material culture of the populations which inhabited this area during an indefinite prehistoric time and early historic time

CAMPING AND OUTDOOR EDUCATION—L. B. Sharp and E. De Alton Partidge, eds.—*Nat. Assn. of Secondary School Principals*, Bull. Vol. 31, No. 137, 197 p., illus., paper, \$1 A discussion of the need for this type of education and how to make it work together, with an annotated bibliography.

CHEMICAL COMPOUNDS FORMED FROM SUGARS BY MOLDS—Bernard S. Gould—*Sugar Res. Found.*, Sc. Rept. Series 7, 17, p., paper, free Demonstrates the potentialities existing in this field of transforming sugars into other chemically useful compounds

DAHLIAS What Is Known About Them—Morgan T. Riley—*Orange-Judd*, 213 p., illus., \$2.50 For all dahlia fanciers, this book answers questions concerning planting, cultivation, and propagation.

FLORA OF DELAWARE AND THE EASTERN SHORE An Annotated List of the Ferns and Flowering Plants of the Peninsula of Delaware, Maryland, and Virginia—Robert R. Tarnall—*Soc. of Nat. Hist. of Del.*, 313 p., \$3.50 A catalogue of flora of a geographic unit which is of exceptional interest botanically because of the make up of the Peninsula, both Coastal Plain and Piedmont Plateau

FOOD PRODUCTS—Saul Blumenthal—*Chemical Pub.*, 986 p., \$12 For anyone interested in the preparation of food, this book presents the manufacture of food as a series of operations governed by physical, chemical, and bacteriological principles. The most modern methods of all types of food processing are here discussed

INTER-AMERICAN UNDERSTANDING AND THE PREPARATION OF TEACHERS—Effie G. Bathurst—*Fed. Sec. Agency, Office of Ed., Govt. Printing Office*, Bull. 1946 No. 15, 100 p., illus., paper, 30 cents A description of work carried on by 22 experimental centers aided by Office of the Coordinator of Inter-American Affairs to promote understanding by way of public-school systems, teacher-preparing institutions, and State and county education departments

LOWER PERMIAN INSECTS FROM OKLAHOMA PART II INTRODUCTION AND THE ORDERS MEGASEOPTERA PROTODONATA AND ODONATA—Frank M. Carpenter—*Am. Acad. of Arts and Science*, Vol. 76, No. 2, 29 p., illus., paper, \$1.25 Insects collected in Wellington strata in Noble County, Okla., a recently discovered bed of an equivalent age to the previously unique Elmo limestone bed

STRATEGIC MATERIALS A Summary of Uses, World Output, Stockpiles, Procurement—John B. DeMille—*McGraw-Hill*, 626 p., \$7.50 Detailed information on 76 strategic metals and minerals, chemical, physical, world supply and production, regulations concerning, and old and new uses are included in this comprehensive manual.

VARNISHED CLOTHS FOR ELECTRICAL INSULATION—H. W. Charfield and J. H. Wrcdden—*Chemical Pub.*, 233 p., illus., \$6 To correlate the work of the three fields that go into this product, textile, varnish making, and electrical engineering, this book has collected a scattered literature and should aid in the choice and use of varnish insulation.

Science News Letter, July 5, 1947

Steam is especially good to blanch asparagus, corn and some other vegetables before preservation by freezing.

Harvesting avocados is done with a long pole with a knife and suspended bag on the end; the fruit cut off the limb by the knife drops into the bag.

MINING

U. S. Coal Reserves Are Enough for 1,500 Years

► THE UNITED STATES has enough coal reserves to supply all this country's requirements in heat, light, power and other uses for 1,500 years, an engineer reported at the meeting of the American Society of Mechanical Engineers.

Dr. Harold J. Rose, vice president and director of research for Bituminous Coal Research, Inc., Pittsburgh, said that at our present rate of consumption, there will be enough coal for another one and one-half millennia.

Pointing out that coal can now be used to make almost any type of fuel or synthetic chemical product, Dr. Rose said that coal is the one bright spot amid threats of shortages in many minerals.

If petroleum and natural gas could be produced fast enough to supply both their present markets and the present uses of coal, the supply of the two products would last only eight and one-half years, Dr. Rose declared.

Science News Letter, July 5, 1947

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☛ **HOLDERS** for skirts and slacks are a pair of wire clamps that are easily attached to any wire coat hanger and positioned to fit the belt of the garment. The belt is inserted in a loop on each holder, the spring of the wire being sufficient to hold it firmly.

Science News Letter, July 5, 1947

☛ **DUCK DECOY** for marsh-duck shooting is made of plastic and rights itself if upset because its keeled bottom is ballasted with cast iron. The lightweight 15-ounce life-like "bird" is made of a plastic that does not splinter or tear if shot; shot-holes can be easily mended with a cement.

Science News Letter, July 5, 1947

☛ **WATERLESS HAND CLEANER** is a paste, supplied in tubes or cans, that quickly removes paints, greases, stains and dirt without the use of water. It can be used on tender skins because it contains no grit, abrasives or harsh alkalis, and does contain lanolin and vegetable oils for skin conditioning.

Science News Letter, July 5, 1947

☛ **CABINET STAND**, usable by the home seamstress or for nuts, bolts, brads and rivets on the mechanic's bench, has trays for tools and supplies attached to the ends of the cabinet that swing out as the hinged ends are opened. The opening of one door exposes all trays to view.

Science News Letter, July 5, 1947



☛ **CARBON DIOXIDE** holder can be used to inflate a flat tire on the road or to extinguish a fire in the car. Its steel tank has a short delivery hose, shown in the picture, which is easily coupled to the intake valve on the tire, or used to direct the gas against a flame. A full tank will inflate three tires.

Science News Letter, July 5, 1947

☛ **CONVEYOR BELTS** that will actually turn corners are made of parallel cross wires linked together at each end, thus forming an open steel belt or broad chain. They can carry packages from

place to place in stores or factories, and are already in use conveying bread from baking ovens to cooling chambers.

Science News Letter, July 5, 1947

☛ **ELECTRONIC** permanent-wave machine requires five to ten seconds per curl and imparts almost no heat to customer or operator. Six permanent waves can be given each hour by a single machine. The heaters are light-weight insulated plastic.

Science News Letter, July 5, 1947

☛ **LABOR-SAVING** auto jack, recently patented, is simply a foldable ramp up which the flat-tired wheel is slowly run. A block is then inserted under the axle and the ramp removed. It is used again, after the tire is changed, to lift the car.

Science News Letter, July 5, 1947

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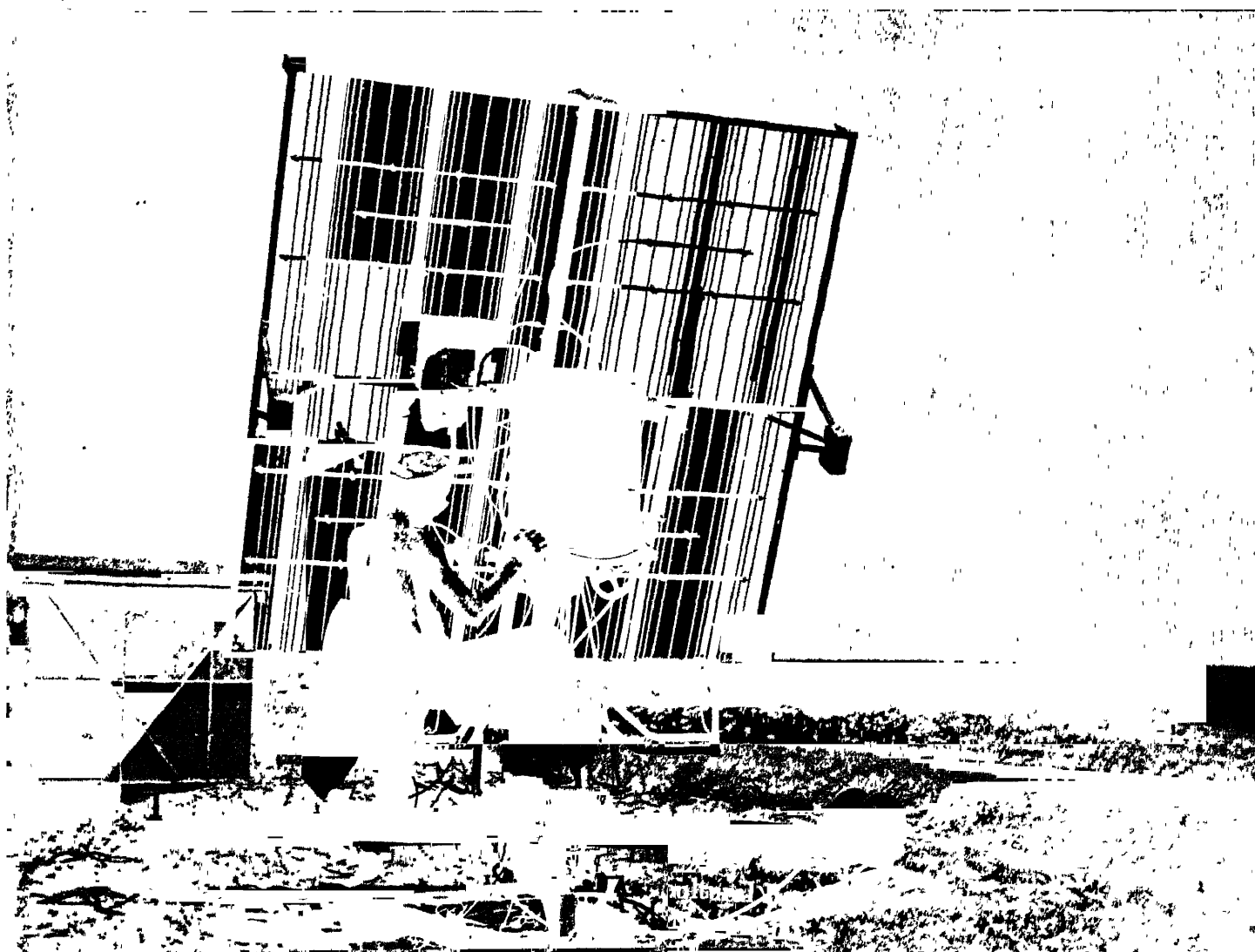
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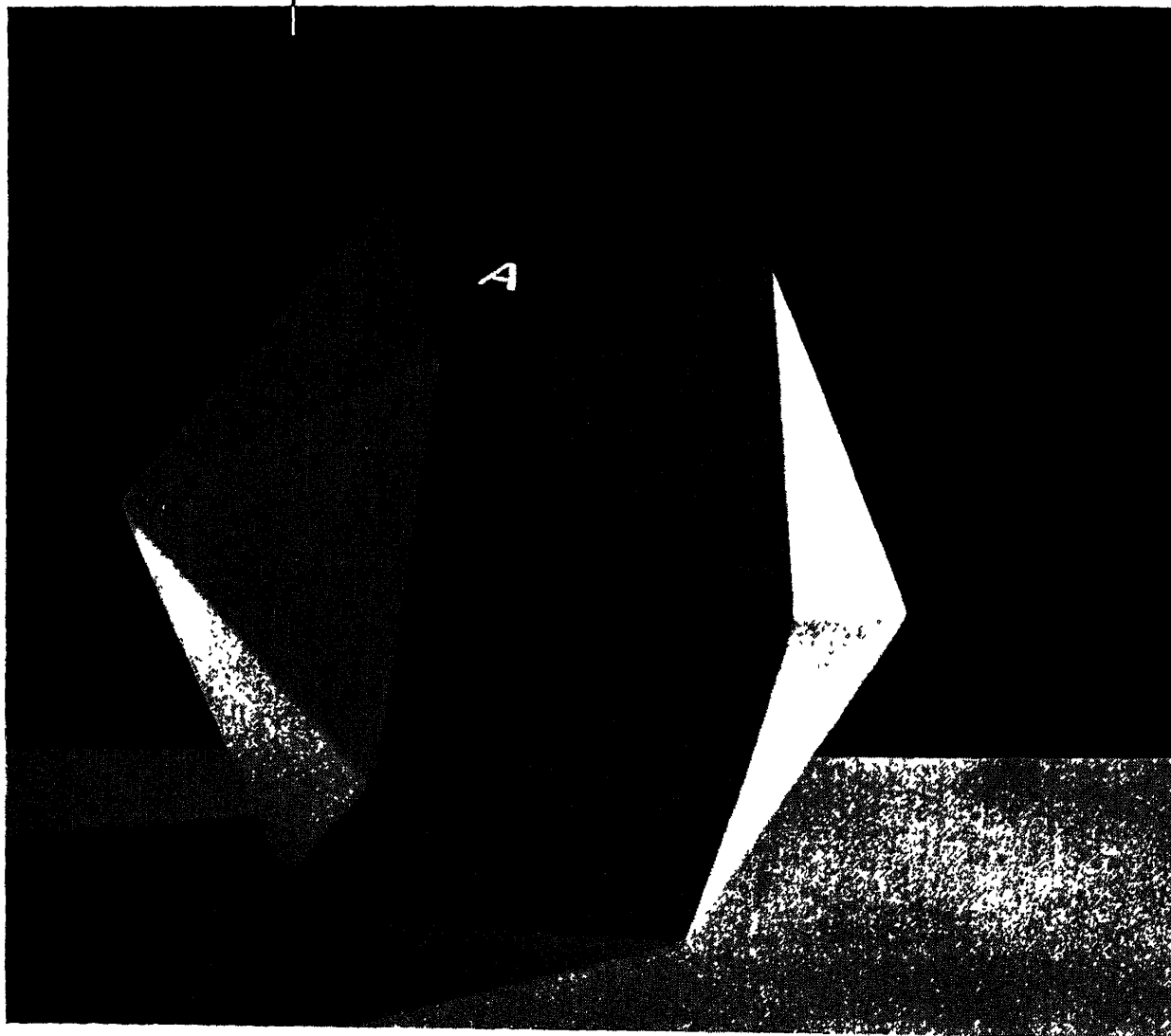
It tells when you will telephone

"It" is an icosahedron—a solid with twenty regular faces. The laws of probability say that if you roll a hundred icosahedrons on a table, eleven or more will come to rest with side "A" on top only once in a hundred throws.

Identical laws of probability rule the calls coming into your local Bell Telephone exchange. Suppose you are one of a group of a hundred telephone subscribers whose practice is to make one three-minute call each during the busiest hour of the day. The chance that

eleven or more of you will be talking at once is also only one in a hundred. Thus it would be wasteful for the Bell System to supply your group with a hundred trunk circuits. Eleven trunks will suffice to give you good service.

Telephone traffic conditions vary. But you can be sure, wherever you live, that Bell Telephone Laboratories research, which pioneered in applying probability theory to telephone traffic, is everywhere helping to make the most use of costly equipment.



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ELECTRONICS

First "Sofar" Station

Navy is using new method for locating survivors at sea by underwater sound system. Picks up sound over 3,000 miles distant.

► THE FIRST "Sofar" receiving station in the new Navy long-range, underwater sound system for locating air and ship survivors at sea, is ready for operation. This station, located at Monterey, Calif., recently heard and recorded the sound of a bomb exploding under water 2,300 miles away.

This Monterey station is the first of four which will be used to cover the Pacific. A second will be located at Point Arena, northwest of San Francisco; the other two on separated islands in the Hawaiian group. All will be ready for use later this year.

Sofar is a war-developed system coming as a by-product of submarine-detection studies carried out under the leadership of Dr. Maurice Ewing of Columbia University for the Navy at Woods Hole Oceanographic Institution in Massachusetts. In tests made in the Atlantic over a year ago, sound was picked up 3,100 miles from its source. It is expected that this range will be doubled with improved equipment.

In the system, a bomb designed as standard equipment on lifeboats is dropped overboard by the survivors. It is triggered to be exploded by the water pressure when it has descended about a half mile. It is then in a layer of water, from some 2,000 to 6,000 feet below the surface which, somewhat like a speaking tube, confines the sound waves within itself and transmits them for long distances.

At the receiving station, recording equipment is connected by submarine cables to nearby hydrophones which are set deep in the water to receive the sound waves. These hydrophones pick up the underwater sound waves much as the ordinary telephone picks up the air sound waves from the human voice.

One Sofar receiving station alone can not determine the position of the exploded bomb. Two or more are required. The sound waves, which travel at about 4,800 feet per second, will reach them at different times unless they happen to be at the same distance from the sound source. In operation, each sta-

tion reports by wire or radio to a central station immediately upon receiving a sound signal, giving the exact time received.

From the differences in time of receipt the location of the bomb explosion is rapidly computed. Then rescue crews are ordered on their way. Tests show that the location is accurate to within a mile or so of the correct position.

Science News Letter, July 12, 1947

ELECTRONICS

Dancing Rainbow Used For Transmission of Voice

► WAVING a rainbow to send signals is the newest thing in light-beam communication methods. U. S. patent 2,423,254 has just been issued on a system using what amounts to that, to Michael Rettinger of Encino, Calif.

The rainbow in this case is an artificial one, produced by projecting a narrow light beam on a prism, but it is just as real a one as the spectrum-arc painted on the heavens by falling raindrops.

In Mr. Rettinger's invention, the sender's voice or code tapings are put

through an electro-magnetic circuit that causes the prism to dance up and down. This in turn produces up-and-down swings in the rainbow-hued band of light projected at the distant receiving station.

At the latter point the spectrum falls on a photocell that is most sensitive to red, least sensitive to blue-violet. The dance of the rainbow, therefore, produces a fluctuating electric current. This is put through an amplifying system, and comes out as a reproduction of the voice or other signal used at the sending station.

This light-signalling system, since it uses light-waves of differing frequencies at a constant intensity, bears to blinkers, heliographs and the like the same relation that frequency-modulation radio does to the older amplitude-modulation kind—for blinking a light on and off is simply producing the widest changes in its intensity, from full-on to completely out.

Rights in Mr. Rettinger's patent are assigned to the Radio Corporation of America.

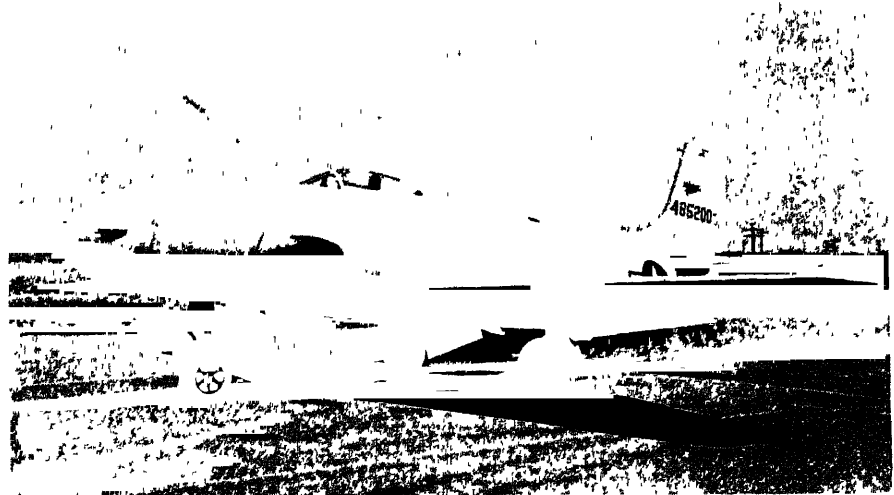
Science News Letter, July 12, 1947

PHYSICS

Highschool Girl Makes Snow-Making Device

► MAN-MADE snow, first produced by a scientist in a laboratory and later in natural clouds, can now be made in your own home for \$4.32—if you are as ingenious as one 17-year old highschool girl.

Kathleen Roan of Providence, R. I.,



SPEEDY PLANE—The world's speed record is held by this P-80R, a special version of the Army's noted jet-propelled Shooting Star. Leading wing edges are sharper, pilot canopy is lower, and air intakes are redesigned to lessen drag.

used such non-scientific apparatus as a couple of her mother's washtubs to build her snow-maker. She built the unique equipment as an exhibit for the Rhode Island Science Fair. Naturally, the judges were "snowed under" and gave her first prize. Since then, Miss Roan has shown her home-made snow device to Vincent J. Schaefer, the General Electric Company scientist who first "made" snow. He suggests snow-making may become a hobby of many young scientists.

Miss Roan first made a refrigerator from a small wash tub placed inside a larger one, with rock salt and chopped

ice between the tubs. By breathing into the smaller tub when the temperature inside it had dropped below freezing, the young scientist produced a super-cooled cloud in which the water droplets remained liquid though the temperature was actually below freezing.

Then, dry-ice was sprinkled over the cloud, and snow crystals appeared.

Other equipment used by Miss Roan included a lamp inside the wash tub to illuminate the snow-making process, a packing case for the tubs and sawdust for insulation.

A little snow might look mighty nice one of these hot summer days.

Science News Letter, July 12, 1947

PALEONTOLOGY

Bones of "Hand Animal"

Prehistoric animal that got its name from the prints made by a foot resembling human hand may now be studied for first time. Bones found in Arizona may be his.

► BONES of the "hand animal," the dinosaur's granddaddy which dominated the world from about 150 to 200 million years ago, may now be in the hands of scientists for the first time.

Chirotherium, which got his nickname because of the amazing resemblance of his hind foot to a human hand, left beautiful footprints all over the world in the mudflats of the lower triassic period of geological time.

But paleontologists have been a little uncertain of what he looked like because they could find no fossils of an animal which might have made such tracks.

Dr. Frank Peabody, of the University of California Museum of Paleontology, has been studying some well-preserved footprints of Chirotherium found in the dull red sandstone beds between Winslow and Flagstaff, Ariz. From these same beds he has recovered fragments of the pelvis, jaw, and skull of an animal which he believes is probably Chirotherium.

The footprints the "hand animal" left in Arizona are so perfect they could have been plaster-of-Paris impressions. So clear are the prints the phalanges of the foot can be counted. The print of the largest specimen is about 15 inches long.

By analyzing the prints and trackways—interval of step, size of print, gait—Dr. Peabody and others have reconstructed Chirotherium's appearance. Members of the Chirotherium group are estimated to have ranged in size from that of a modern chicken to a monster

standing six feet high or more at the hips. They had a tendency to be bipedal, with front feet about half the size of the hind feet.

"University of California field parties have already found bone fragments which almost certainly represent Chirotherium, but as yet positive proof in the form of a complete or nearly complete skeleton has eluded them," Dr. Peabody said.

Science News Letter, July 12, 1947

ORNITHOLOGY

Sea-Faring Bird Goes To Philadelphia's Zoo

► A WINGED landlubber that strayed 300 miles out over the Gulf of Mexico is now safe in the Philadelphia Zoo.

The wandering bird, now safely in a cage at the zoo, is a smooth-billed ani, a native of South America and the West Indies. It is larger than a robin, with black plumage and large hump on its bill.

The bird flew aboard the S. S. Fredericksburg as the tanker ploughed through the Gulf of Mexico.

Other sea-going birds which have gone to the zoo in recent years include a snowy owl, picked up off the coast of Greenland, and an Indian crow that flew aboard a ship 100 miles off Hindustan.

Science News Letter, July 12, 1947

AGRONOMY

Paper-Mill Waste Good For Liming Acid Soils

► FARMERS in northern Wisconsin have found that a paper mill waste—the greenish, ill-smelling sludge dumped by the mills after pulp is processed for paper—is rich in lime and just the thing for acid soils.

The mills are gladly cooperating with the farmers in making the sludge available to them, because getting rid of the waste has always been a serious problem. County agricultural agents, too, are cooperating by making available testing facilities to determine whether soils need lime.

Science News Letter, July 12, 1947

SCIENCE NEWS LETTER

Vol. 52 JULY 12, 1947 No. 3

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., North 2256. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

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ENGINEERING

Water Flows Under Divide

Long tunnel carries water for irrigation from Grand Lake to Mary's Lake. Will supply low-cost electric energy for use in area.

➤ WATER is now pouring under the Continental Divide in northern Colorado through the Alva B. Adams tunnel, longest ever driven by drilling from only two openings.

The tunnel, 13.06 miles long, carries surplus Colorado River water from Grand Lake to Mary's Lake, near Estes Park, Colo. The tunnel is cut 3,800 feet beneath the hump of the Rockies. Water flows downhill through the \$7,000,000 tunnel without mechanical help from pumps.

This Bureau of Reclamation project will irrigate more than 615,000 acres in the Big Thompson River region. It will also supply over 700,000,000 kilowatt-hours of low-cost electric energy for use in the area.

Three reservoirs to control the Colorado River are operating on the western slope of Colorado's Divide. At one of these, Green Mountain Reservoir, a power plant is being built.

Horsetooth Reservoir is now under construction on the Rockies' eastern slope near Fort Collins, and plans are

underway for two more control reservoirs nearby.

Water from the tunnel will drop through seven power stations on its way to the plains. Work has started on the stations at Mary's Lake and Estes Park. Part of the electricity will be used to pump water from one reservoir to another in water control operations. The rest of the power will serve the surrounding region.

Total cost of the giant project, to be completed by 1952, is estimated at \$128,000,000. Most of this will be repaid by the sale of power, the Bureau of Reclamation predicts.

Science News Letter, July 12, 1947

HORTICULTURE

Dandelion Survivors Are Deformed by 2,4-D

➤ THE NEW weed-killer 2,4-D usually lays its victims low in a short time. This gives all the greater interest to this picture, which shows what happened

to some dandelions that survived a late-fall spraying and tried to produce flowers and seeds.

Late last fall, when the weather was already cold, 2,4-D was sprayed on several acres of lawn at the U. S. Plant Industry Station at Beltsville, Md., to kill plantains and dandelions growing there. It got the plantains 100 per cent, but a few of the dandelions survived. When they tried to blossom this spring, they produced monstrosities like those shown here.

Outstanding effect was a pronounced "siamesing" of stems and production of multiple flowerheads, closely resembling the type of freak growth sometimes found occurring naturally and known to botanists as fasciation, from its suggestion of the faces, or bundle of rods, of ancient Roman heraldry.

Most completely fasciated stem is shown at the left, which seems to have borne almost completely aborted flower structures. Strangest effect is shown at the right, where a nearly normal stem bore a frustrated flower-head, which in turn produced from its center a secondary, miniature stem and flower-head.

Science News Letter, July 12, 1947

PHYSICS

Spectrograph Records Light from Atoms

➤ A NEW infra-red spectrograph, first instrument especially designed to record with a photo-electric cell the light given off by excited atoms, has been developed by Dr. Richard C. Nelson, Dr. R. J. Cashman and Wallace R. Wilson of Northwestern University.

The new device is a combination of mirrors mounted on a heavy steel base. It breaks down infra-red light into separate wavelengths, just as a prism splits white light into its colors.

A photo-electric cell detects these individual wavelengths and converts the light energy into electrical energy which is recorded on a graph.

The scientists said that the new infra-red spectrograph almost doubles the range of atom-emitted light on which exact measurements can be made. With this spectrograph, which will give valuable information about the nature of the atom, observations that once took a month can now be made in an hour, they declared.

Construction of the spectrograph required bearings of unusual design, machined to accuracies of a millionth of an inch in some cases.

Science News Letter, July 12, 1947



DEFORMED—These fantastic shapes are caused by weed-killer.

RESOURCES

Pipelines Delayed

Construction of refineries also may be held up by shortage of steel now developing. Need dry weather months for laying new pipelines.

➤ A SHORTAGE of steel, already developing, means further delay in the construction of refineries and pipelines to decrease the threatened fuel oil and gasoline shortage. Production the first week of July was about three-fourths capacity.

Decreasing steel production is due to the increasing shortage of coal resulting from the miners' walkout in protest against the Taft-Hartley bill, according to the American Iron and Steel Institute.

An increased shortage of steel now will have far-reaching results. The good-weather period is here and ahead, when the construction of buildings and bridges proceeds rapidly. Dry-weather months are essential in laying new pipelines, and new lines are necessary before the Midwest will have a plentiful supply of liquid fuels again.

Industry expected, and was somewhat ready for the scheduled coal miners' two weeks vacation the first half of this month. It was not prepared for the early walk-out coupled with the vacation. It

is almost entirely unprepared for any threatened extended "vacation" that may follow.

The threatened shortage of coal is also beginning to worry railroad officials. It is the season when crop movements and passenger travel are high. Electric and diesel locomotives have been widely advertised, but train movements are still principally powered by coal. This is particularly true of the freight engines that are now moving wheat and other crops.

Steel shortage will affect industry building expanded plants in all parts of the country. A summer shortage of coal will be serious to northern factories because the summer and early fall is the season when northern manufacturing plants stockpile coal for the winter. Industrial areas bordering lakes Superior, Huron, and Michigan rely upon lake transportation for much of their fuel for heat and power. Delivery by boat must take place while the Great Lakes are still open.

Science News Letter, July 12, 1947

OCEANOGRAPHY

Lost—Large Iceberg

➤ A LARGE iceberg "lost" in the foggy weather of the North Atlantic is sufficiently menacing to steamship travel to cause the scheduled shift northward of trans-Atlantic routes due on July 1 to be postponed.

Last sighted on June 25 by the International Ice Patrol, the berg is believed to be between 100 and 200 feet long. Although the U. S. Coast Guard ships are equipped with radar and other new searching devices unknown in pre-war days, foul weather over the Grand Banks has prevented them from picking up the great floating piece of ice since last Friday. It was then at 43 degrees, 55 minutes north latitude and 48 degrees, 59 minutes west longitude. This is too near for safety to scheduled new track C which "turns the corner" of the Atlantic when longitude 50 degrees west crosses 43 degrees north latitude.

itude for westward ships and 42 degrees north latitude for eastward ships.

Until the berg is located, which will be done quickly by air patrol as soon as the fog lifts, ships will stay on the more southerly track B. Those Europe-bound will travel farther east before they set a course on the great circle that will lead them most directly to the channel ports.

May is usually the month during which icebergs, coming down the Labrador current from their birthplaces in Greenland glaciers, are most plentiful. Sometimes there is another wave of floating ice toward the end of June, but usually it does not reach so far south and does not menace ships. The International Ice Patrol has a saying: "Home by the Fourth of July" but its sailors were still standing guard against another Titanic disaster this Fourth.

Science News Letter, July 12, 1947

ANTHROPOLOGY

Tepexpan Man Is Young for His Age

➤ FOR ALL his age, Tepexpan Man is "modern," scientists studying him at the National Museum have found. His high-domed, thin-walled skull contained a brain of the same size as those of present-day Indians. His eyebrow ridges are rather prominent, but not more so than those of many a still-living head. His lower jaw is solidly built, but is not Neanderthaloid. In particular, a sharply prominent chin separates him from the Neanderthal type. (See *SNL*, July 5)

He was middle-aged when he fell on his face in the marsh and died. This is shown by the solidly united seams in his skull, and by the completely ossified ends of his arm and leg bones. He was probably 40 or over when he went on his fatal last hunt.

He had lived hard before he died. One of his right arm-bones had broken just short of the wrist and had healed again. He suffered from a stiff neck, for there are limy deposits on the vertebrae showing that arthritis had set in. There were only three teeth left in his upper jaw. All the molars had departed from his lower jaw some time before he died, for the place where their sockets had been is quite smoothly healed over. The remaining lower teeth—incisors, eye-teeth and premolars—are considerably worn but otherwise in good condition.

That much of his story Tepexpan Man



PUZZLE—This picture shows how the fragments of bone are painstakingly fitted together in restoring the ancient skull of Tepexpan Man.



OLDEST MEXICAN—The recently found bones of an ancient man are spread out before the scientists who are busy with his restoration. Dr. T. Dale Stewart of the U. S. National Museum (left) holds the skull of a modern Indian for comparison. At the right is the Mexican anthropologist who made the discovery, Dr. Javier Romero. The case in which Dr. Romero brought the bones by airplane to Washington is shown at the far right.

told a little group of scientists and newspapermen at the U. S. National Museum after his arrival. The rest will come out as his much-broken face bones and what is left of his skeleton are pieced together by Senor Javier Romero and Dr. T. D. Stewart of the National

Museum. After comparative studies, in which the huge collection of Indian skulls will be used for comparison, Tepexpan Man will return to his native country, where he will be "in residence" at the Mexican National Museum.

Science News Letter, July 12, 1947

AERONAUTICS

Supersonic Flight Ahead

Unconventional planes, still cloaked in military security, may lead to man's flying faster than the speed of sound. New planes do not have limits of XS-1.

➤ THE ARMY is building new, high-speed aircraft for research on flight faster than the speed of sound, Col. Philip B. Klein of the Army Air Forces Air Materiel Command, Wright Field, Ohio, revealed at the meeting of the American Society of Mechanical Engineers in Chicago.

Describing the AAF's experimental rocket plane, the XS-1, Col. Klein said

that the new planes will "give us the answers beyond the limits of the XS-1."

The new aircraft are still cloaked in military security, but Col. Klein reported, "all of them are rather unconventional in appearance in that they have either swept-back wings, very thin wings with a very small aspect ratio or are tailless or semi-tailless."

The XS-1, Col. Klein declared, was

not designed for flight at speeds faster than the speed of sound. The XS-1's job is "to explore the transonic region and to provide us with actual flight data which might enable us to build a supersonic plane in the near future," he said.

"We want to be certain that when we do venture into the transonic region we have an aircraft strong enough and controllable enough to cope with whatever unpredictable effects may be manifested," the AAF officer explained.

The XS-1 has several advantages from being launched from a "mother" B-29, Col. Klein told the engineering society.

Launching the high-speed plane in the air avoids dangers from heavily loaded take-offs with rockets for power, makes possible test glide flights without power, saves fuel and simplifies transportation of the plane, he said. Another advantage is raising the potential speed of the XS-1 from 1,100 miles per hour from a ground take-off to 1,700 miles per hour from launching in the air.

These speeds are strictly "potential," Col. Klein warned. "For quite some time our flying will be done at subsonic speeds (less than the speed of sound)" he stated.

Col. Klein said the AAF does not know when it will be able to fly faster than the speed of sound, but, he added, "So far as we know, there is no limit as to how fast a man-carrying aircraft can be made to fly."

Science News Letter, July 12, 1947

METEOROLOGY

Radar Now Used To Spot Invading Storm Clouds

See Front Cover

➤ RADAR apparatus like the one shown on the front cover of this week's SCIENCE NEWS LETTER, which during the war kept an alert watch for enemy airplanes, now is used in weather observation.

The radar can pick up the electrical forces generated in thunderclouds and possible electrical disturbances to communication. It is also used to follow the balloons that carry radios for broadcasting weather data from aloft.

The apparatus shown on the cover is at the Air Weather Service Station at the guided missiles proving ground at White Sands, New Mexico, where the Army Air Forces has a staff investigating atmospheric conditions at altitudes previously inaccessible.

Science News Letter, July 12, 1947

PHYSICS

Liquid Nitrogen Used To Liquefy Oxygen

➤ "FREE as air" isn't always an apt simile. Air separated into its constituent gases and liquefied can be sold at a good profit, especially the liquid oxygen. To make this profitable use of air, C. C. Van Nuys, research physicist of the Air Reduction Company, Inc., has developed two processes in which liquid nitrogen is used to chill oxygen to the liquefying point.

One of the processes, covered by U. S. patent 2,423,273, operates at low pressure—not more than 45 or 50 pounds per square inch—because such pressures can be developed by blowers that do not pollute the air with lubricating oil to form a dangerously explosive mixture with liquid oxygen. The other process, on which patent 2,423,274 has been granted, uses pressures around 3,000 pounds per square inch and accepts the risk.

Both processes depend on the fact that oxygen liquefies at a different low temperature from the liquefying point of nitrogen and the rare gases krypton and xenon. The latter, insofar as they are not needed for refrigerating purposes in the apparatus, are discharged separately and can be either sold or thrown away.

Science News Letter, July 12, 1947

NUTRITION

Orange Juice Adds Color To Frozen Sweet Potatoes

➤ YOU MAY have orange juice in your sweet potatoes and ice cubes in your gravy one of these days. These are two of the latest frozen food wonders. The wonder will be that you won't know it if you do have these delicacies.

Ice cube gravy and sweet potatoes with orange juice are two developments in a study being made by home economists at Cornell University to help the Navy serve palatable meals from frozen foods.

Ella Gleim and Faith Fenton found that gravy must be frozen rapidly to avoid excessive bacterial growth. The solution to that problem was to put ice cubes in the gravy for rapid chilling.

Mashed sweet potatoes with milk had a gray color, so the home economists used orange juice. After three months in freezer storage, the sweet potatoes still had a fresh flavor and a bright orange

color which made them appetizing.

The Cornell investigators have discovered some complications in planning meals for freezing and reheating when they are to be served. Foods differ in the rate of heat penetration. Thus, a cook reheating a frozen meal with chicken, potatoes and broccoli would find the broccoli cooked by the time the chicken and potatoes were thawed out.

This can be adjusted, the home economists found, by completely cooking the chicken and potatoes before freezing.

Tests with temperatures of zero and 15 degrees Fahrenheit showed that the food was acceptable after three months storage at either temperature, but the lower temperature produced the better result. Experiments are now planned at below-zero temperatures.

Science News Letter, July 12, 1947

ZOOLOGY

National Zoo Acquires Some New Inhabitants

➤ THE National Zoological Garden will have a variety of new beasts and birds. Just received by Director William M. Mann are a pair of tamanduas, which are middle-sized anteaters from South America; a pair of pacas, large guinea pig-like rodents, also from South America, and a pair of young spotted hyenas from Africa.

Antarctica contributes a pair of king penguins, and from Panama come 10 pairs of honey-creepers. The latter are small, beautifully deep-blue birds that cling tightly to the stems of plants while they sip nectar from the flowers.

Two secretary birds, long-legged snake-destroyers from South Africa, have just been received. The sharply-curved tips of their beaks and their bold golden eyes give them the general appearance of hawks on stilts.

These birds get their name from the resemblance of their stiff-feathered crests to a bunch of quill pens stuck behind the ears of some counting-house character out of Dickens. They are the African "opposite numbers" of the road-runners of our own Southwest. They attack snakes by beating them down with their strong feet, then finishing them off with their beaks.

In Boer country they are known as "slangenvreter," which is Afrikaans for snake-eater. So useful are they in the control of cobras and other venomous serpents that they have been given the protection of a special law.

Science News Letter, July 12, 1947

IN SCIENCE

VOLCANOLOGY

Iceland's Mt. Hekla Erupts Same Old Lava

➤ WHEN Iceland's famous volcano, Mt. Hekla, erupted last March, it was news, but a scientist has found that the lava which flowed from the crater was nothing new, geologically.

Dr. G. W. Tyrrell of the geology department of University of Glasgow in Scotland received a sample of lava from this year's eruption of Mt. Hekla and compared it with earlier samples, including one collected by a British scientist in Iceland in 1810.

The geologist's conclusion: Same old stuff.

Or as Dr. Tyrrell concluded in a report to the British journal, *Nature*: "It may therefore be concluded that the Recent basalt lavas of Iceland are very uniform in composition and that there has been little or no change in that respect during the historical period."

Science News Letter, July 12, 1947

ELECTRONICS

Purifying Equipment Available for Homes

➤ NOW private homes can be free of dust, soot and pollen—at least of any that enters with the fresh air for circulation by hot-air heaters or air-conditioning.

The removal unit is of the type known as the electronic precipitator, which is already used in theaters and other public buildings. This home unit, which occupies a space about two feet square, is attached in the basement to the furnace or air-conditioner. It is made by the Raytheon Manufacturing Co., and operates on the house current.

Within the cabinet in the unit, a strong electrostatic field is created by the current. The particles of dust passing through the field are given a positive electric charge. As the air moves onward, it passes through vertical collecting plates charged negatively. These are the dust collectors.

These plates need occasional cleaning. The process is simple. The electric current is cut off, and a water valve turned on. A spray quickly does the washing.

Science News Letter, July 12, 1947

THE FIELDS

ENGINEERING

Prefabricated Shelter Made for Cold Climates

➤ A PORTABLE, prefabricated shelter for troops in Arctic climates, revealed by the Army, is under advanced design by the Corps of Engineers. Complete building, unassembled, will be light enough for cartage by plane.

Lightness and warmth are two essentials. The sidewalls and flat roof will be made up of panels, eight by four feet in size, composed of two thin sheets of aluminum with insulation between. The flooring is the same type of panel with the addition of an eighth-inch layer of wood on its upper surface. Outside surfaces need no paint; inside walls are painted to give a "warm color."

The standard building is eight feet wide, 20 long and nine high. Its width, however, can be doubled, and its length increased. The building is supported by a rigid aluminum frame. A novel feature is the floor beam. It is an open truss aluminum joist with a jack at each end. This makes easy levelling of the structure on rough land or ice.

Heating plans are designed for an indoor temperature of 70 degrees Fahrenheit when it is 70 degrees below zero outside. The structure will withstand a 125-mile-an-hour gale. It can be quickly assembled by unskilled workmen wearing Arctic clothing, including gloves.

Science News Letter, July 12, 1947

PHYSICS

Tube and Cellophane Used for Shock Wave Study

➤ A SIMPLE instrument, basically a metal tube about eight feet long, divided by a piece of cellophane, has been devised for shock wave studies by Dr. Lincoln G. Smith, of the department of physics at the University of Michigan.

Shock waves produced in the tube are like those from bombs and depth charges, though much weaker.

Dr. Smith suggested that this equipment might be used as an inexpensive wind tunnel. Very high pressures in the small chamber would force wind from the explosion through the tunnel at supersonic speeds, he said.

Cellophane separates the metal tube

into two sections, one longer than the other. The shorter chamber is filled with compressed air. The compressed air explodes through the cellophane when the partition is punctured by a plunger.

In a fraction of a second, the shock wave from the explosion rushes to the end of the tube's longer section. There it strikes a metal plate, which can be adjusted to different angles.

The tube has a glass window on each side of the plate. An electric spark outside one window photographs the shock wave, just as it hits the metal plate, on a film held against the other window.

Science News Letter, July 12, 1947

PUBLIC HEALTH

Much Money Needed For Safe Sanitation

➤ NEARLY \$8,000,000,000 is needed to give some 100,000,000 Americans improved water supplies and waste disposal to cut down danger from filth-borne diseases such as dysentery, diarrhea and typhoid fever, the U. S. Public Health Service revealed.

The figures are based on an extensive survey just made by the Service, with state and local health authorities co-operating. It is called a sanitation inventory, and the report of the survey itemizes, state by state, the cost of obtaining the healthy environment essential to a national health program.

Water works construction is needed to serve 81,000,000 persons living in cities and towns. Sewerage facilities are needed for some 85,000,000 people in cities, towns and communities of over 200 population. Approximately 27,000,000 persons living in rural homes have unsatisfactory water supplies, and 33,000,000 rural residents lack adequate waste disposal facilities.

A full report of this sanitation survey will be available to officials and others interested early in the fall from the Federal Security Agency.

Science News Letter, July 12, 1947

HORTICULTURE

Cut Your Roses Late If You Want Them to Keep

➤ ROSES are gathered better late than early. Late afternoon is the best time to cut roses you want to keep well, say U. S. Department of Agriculture scientists. This is probably because the leaves and stems have more carbohydrate in them after a sunny day.

Science News Letter, July 12, 1947

ASTRONOMY

Sunspot Maximum Predicted For the End of Next Month

➤ SUNSPOT maximum will be reached this August, if the calculations of Dr. A. G. McNish and Miss J. Virginia Lincoln of the Central Radio Propagation Laboratory, National Bureau of Standards, are correct.

From now until the end of the summer, the number of gigantic spots on the sun that may easily be seen through smoked glass and small sunspots visible only with a good telescope may be expected to increase. But after August, fewer large clusters and minor splotches will be seen on Old Sol's disk.

The number and activity of sunspots, whirlpools in the outer layers of the sun showing variations of the sun's temperature, are general indicators of the relative intensity of radiations sent from the sun to the earth. Prediction of long-term changes in solar activity is therefore important in forecasting several months in advance just how radio waves will act. This helps radio engineers calculate the best usable frequencies for communication between any points in the world at any hour of the day.

Prolonged, moderate disturbances are frequent during sunspot minimum. Briefer, more erratic storms tend to occur during sunspot maximum. They usually take place a day or two before a large spot passes the sun's meridian.

It is the sun's ultraviolet rays that ionize the atmosphere. The upper regions, 30 to 250 miles above the earth where the air particles are spaced so far apart, stay perpetually ionized. The lower ones, ionized during the day, return to their normal non-ionized state at night.

When a broadcasting station issues a series of radio signals, the energy travels in two ways. One wave travels along the ground, gradually becoming weaker as it spreads out over a greater area and as energy is absorbed from it. The sky wave travels upward until it reaches the ionized region of the atmosphere and then is reflected back in much the same way that light is reflected from a mirror. Sometimes short radio waves are bounced back and forth between the ionosphere and the earth's surface many times before they reach your receiving set.

Science News Letter, July 12, 1947

ANIMAL PATHOLOGY

Cattle Disease War

A million animals are doomed to death in Mexico's all-out war against foot-and-mouth disease being fought with the aid of U. S. veterinary forces.

By WATSON DAVIS

➤ IF THE DEVIL himself went these days to central Mexico, he would be caught and slaughtered along with all the other cloven-hoofed animals.

For he would be exposed to the greatest danger to America's livestock industry—foot-and-mouth disease. The fate of all the cloven-hoofed animals that can catch and carry "fiebre aftosa," as the cattle disease is called in Spanish, is decreed to be death.

Mexico is waging a full-scale war against an enemy which is a virus. Rifle fire, chemicals, road blocks, jeeps and bulldozers, ambulances, tank trucks and sprayers are used in the fight. The Mexican army is in action.

In the midst of the territory invaded by the virus from abroad is the Mexico

City GHQ of the combined American-Mexican veterinary forces that are fighting the invasion with slaughter and disinfectants.

Seventy top U. S. veterinarians and engineers have joined the battle. More than 90 carloads of heavy machinery, power shovels, bulldozers, jeeps, trucks, tank trucks, sprayers and trailers have been rushed into the Mexican battle area from U. S. surplus war stores. American dollars, Mexican pesos and manpower from both countries are working side by side.

At present the war is a gigantic holding operation. A major effort is being made to keep the infection within the large area that it has already invaded. Barriers against its spread are flung across the country north and south. Veterinary scouts are alert to discover and swiftly

stamp out any outbreak of the disease in any other areas. American veterinarians and officials are particularly anxious to prevent at all costs any possible spread across the Mexican-U. S. border northward.

A finish fight of long duration is being organized. Only by ruthlessly wiping out all the cattle in an infected area, whether they are ill or not, can aftosa be eliminated. A million animals—two-thirds of them cattle—are in the area and all are doomed.

Vaccines, which are used in Europe where the disease is always present, cannot be used to eliminate the disease in Mexico. Extermination by death to all cloven-hoofed animals is the only method being used in the joint American-Mexican campaign. Anything less is considered by the experts as temporizing and too dangerous. Unless the disease is eradicated, sooner or later the cattle disease will spread to the whole of the North American continent, with disastrous food and financial effects.

A large new building, in the heart of Mexico City's older section, houses the joint Mexican-U. S. staffs. A northern Mexico stockman and lawyer, Oscar Flores, Mexican undersecretary of agriculture, is director of the aftosa organization, while Dr. M. S. Shahan, a top-flight scientist of the U. S. Department of Agriculture, is the co-director in charge of the American participation.

Millions Being Spent

Millions of dollars are being spent on equipment, supplies and personnel and as indemnities for cattle, hogs, sheep and goats slaughtered. The U. S. Congress appropriated \$9,000,000 for use up to July 1 of this year and the Mexican government is spending \$9,350,000 up to the same time. Before the fight is over it may cost \$250,000,000, an investment to save the U. S. \$12,000,000,000 cattle industry.

American government officials and stockmen are apprehensive and determined in the fight. Never before has the North American continent had such a widespread foot and mouth disease invasion. But there have been serious invasions before, notably the one that invaded 21 states and the District of Columbia in the United States in 1914. These were stopped by the same meth-



DISEASE WAR—In the fight against foot-and-mouth disease in Mexico all travelers must walk through sawdust wetted with caustic soda solution. Even a little Mexican girl must tread the disinfecting sawdust trail under the eye of a Mexican soldier.



ods—rigorous quarantine and killing of all exposed animals that can get the disease and can carry it—cattle, pigs, sheep, and all other cloven-hoofed creatures, domestic and wild.

Thousands of Mexicans, by day and by night, are reminded of the war on the cattle plague when they have to walk along a sawdust trail, saturated with lye, whenever they leave a quarantine zone. Every automobile, bus, and truck must ford a little pond of caustic soda solution. This disinfection method is an attempt to prevent the infected dirt of barnyards from carrying the very contagious disease to uninfected parts of the nation. Every road leaving Mexico City has aftosa quarantine blocks where, under the watchful eyes of soldiers, all who travel must be purified by getting out of their vehicles and trudging through the mushy disinfecting trough. Some of the country people walk through the caustic with their feet bare, since it is usual for them to go shoeless.

Much Soda Used

Large amounts of sodium hydroxide (caustic soda or lye) disinfectant are being used. It is sprayed freely on barnyards and cattle runs when extermination of the disease is undertaken. Already over 120 tons of the chemical have been imported from the United States. This caustic is the best disinfectant against aftosa and in most cases only a 2% solution need be used.

Such quarantine measures may prevent foot-and-mouth disease from spreading. But slaughter is the real weapon against the epidemic. Eventually all animals in the infected area that can get the

disease will be killed. Those that are not yet sick are being sent to market as fast as possible, at the rate of a couple of thousand a day. Fortunately human beings do not often contract the disease by eating meat or by contact with diseased animals. When they do, it is a very minor trouble.

Sick animals and those in contact with them are killed and buried in deep trenches, dug by bulldozers and power shovels. Owners are paid for the animals that have to be killed.

Payment a Problem

Indemnifying the owners is one of the difficult parts of the program. If too much is paid for sick animals, some unscrupulous cattlemen might find it profitable to spread the disease in hope of collecting more than the animals are worth. If too little is paid, the owners might not let them be killed. They might hide them in the mountains, where they would remain a danger.

No animal is paid for until it is killed and buried. Wealthy ranchers have seen whole pedigreed herds driven into mass graves and shot. A poor peon will lose his yoke of oxen used for plowing.

Paymasters carry hundreds of thousands of pesos in cash to where the killing is done and they pay off in cash on the spot. Remodeled U. S. army ambulances with their red crosses painted out are used as paymaster cars. Some of the Mexican farmers have had put in their hands more cash than they had ever seen before.

If the oxen that plowed the land are killed, crops can't be raised. Cash can't raise food. So mules are being bought

in the United States and rushed into Mexico to replace the slaughtered oxen. Twenty thousand mules are on the way and double or triple that number will be needed. Mules are not the same as oxen, but mules, like horses, don't get aftosa. The Mexicans will change their ways and use mules. They may raise more crops as a result. For mules are more active animals and work faster.

May Modernize Farming

The aftosa calamity may bring about a revolution in Mexican agriculture. Tractors, drawing modern plows, may replace oxen in some cases. Power farming may directly supersede cultivation methods that were outmoded in the middle ages. A disease disaster may become a blessing in disguise, although the campesino who has his little plot of land, thanks to the Revolution, can not be expected to think so.

There will be some unusual hunting in Mexico in the aftosa infected regions. Wild animals that can contract the disease must be eliminated. Deer, antelope, and wild pigs or peccaries must be

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Instrument can be used with either thick or clear solutions at any temperature to 50C. It's affected neither by "sucky" weather (unless relative humidity is over 95 and ambient temperature is over 30C), nor by the electric fields of other nearby equipment.

Catalog E-96(2) gives further details.

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MEASURING INSTRUMENTS THERMISTORS AUTOMATIC CONTROLS HEAT TREATING FURNACES

Jr Ad E-96 (25e)

Do You Know?

Less than half as much *wood* is used in America for fuel as 50 years ago.

Otters sometimes take over *burrows* dug by muskrats or beavers, some naturalists claim.

"Radiant heating" of homes means that *warmth* is supplied from steam or hot water pipes built into the floors or sidewalls.

The Keystone or Treaty *oak* at Jacksonville, Fla., is so large that 4,000 persons can stand in its shade at noon, it is estimated.

New fountain pen *ink* writes dry by vertical penetration into the paper and not by evaporation or drying of the solvent, the makers claim.

Television broadcasts are available today to some 25,000,000 people living in eight metropolitan areas; by 1948 they will be available to an additional 10,000,000.

The American Great Lakes, covering 95,000 square miles of deep water, never freeze over, but each winter heavy ice forms along shore lines, in places several miles in width.

In India, a million acres of *safflower* are grown each year; the thistle-like flower is used to make a yellow dye, the leaves are used in salads, and oil from the seeds as food and in paint.

Many new *insecticides*, germicides and fumigants have names composed of initials such as DDT; they are confusing but much simpler to the layman than their long and complicated chemical names.

Corn derivatives are used as principal *ingredients* in making candy, jellies, preserves, baked goods and other food products; they are used in brewing malt drinks, finishing textiles and in adhesives and soap.

The wartime Emergency Plant Disease Prevention Project was handled by 44 experts in the field who traveled almost constantly, investigating conditions to offset any attempts at sabotage by spreading *plant disease*.

wiped out. Airplanes will be used to locate the wild animals to be hunted, as well as domestic cattle that may have strayed into the wilderness and hills.

Meat is plentiful in Mexico now, but in coming months, as the aftosa war continues, it will become scarce. Just now cattle are being rushed to the market. Officials are hopeful that Europe can be supplied with some of the Mexican meat, since foot-and-mouth disease is already widespread there. Canning of meat in Mexico may be undertaken to save some of the excess that must be either used or wasted.

American stockmen and government officials want the United States to do more than cooperate in the actual aftosa war in Mexico. First of all, perhaps, they would like to see a good, tight, woven wire fence along the Mexican-

U. S. border that would keep hogs, cattle and people from coming over unannounced, carrying with them the dangerous foot-and-mouth and other infections.

They want to see research work on foot-and-mouth disease undertaken on a major scale in order to be better prepared if the disease can not be held in check in Mexico and does spread northward. To prevent any accidental spread, these investigations must be conducted outside the western hemisphere in countries that already have the disease.

Meanwhile, the best of our fighters against animal diseases, under the direction of the famous Bureau of Animal Industry of the U. S. Department of Agriculture are at the front in Mexico. And there are alert veterinary reserves patrolling the border.

Science News Letter, July 12, 1947

MINERALOGY

Metal Resources Limited

Known deposits in U. S. are expected to be gone in from 10 to 75 years. Present petroleum supplies will last only 15 years. Bituminous coal will last for centuries.

➤ AMERICA has plenty of coal to ship abroad, if miners continue to work. But the natural supply of other American mineral resources is decidedly limited, as for example, petroleum fuels.

What we can spare, what we must hold for the future and what we must import is becoming a prime national question.

There is plenty of uncertainty relative to this nation's mineral reserves.

A bipartisan committee of experts is being urged to study the situation. It will have a double-headed job: 1. To determine which and how much of the minerals produced in the United States can be spared for other countries, and 2. What foreign minerals, and in what quantities, should be obtained from abroad and stockpiled for future emergencies.

Undoubtedly there are vast deposits of minerals in America as yet undiscovered. At present, however, only known deposits can be considered in determining both exports and import needs. In the last report of the U. S. Bureau of Mines it is urged that an inventory job on a national scale be undertaken at once. It is a survey that would take years to complete. Every known scientific method of determining

mineral deposits would be employed, both in continental United States and in Alaska.

An idea of the present situation can be obtained from an unpublished report made earlier this year to Congress by the U. S. Bureau of Mines and the Geological Survey. It contains estimates of the 42 most essential minerals in known reserves. Discovery of new deposits, however, would change the picture.

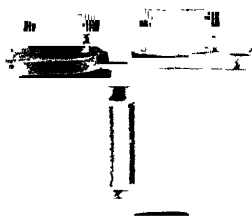
Among metals, based on the average annual production and consumption during the ten years ended in 1944, magnesium, molybdenum and titanium exist in plentiful quantities. Titanium oxide is widely used as a pigment in paint; molybdenum is important in steel alloys.

Iron ore is sufficient for 76 years. Other estimates are for a greater period, but it depends upon improved methods of reducing ores of low-grade now unused. Domestic bauxite for aluminum will last 23 years. With new methods of obtaining alumina from other clays, the supply of aluminum is assured for a much greater period. There is a 50-year supply of arsenic and a 36-year supply of bismuth. (*Turn to page 30*)

WAR BARGAINS in LENSES and PRISMS

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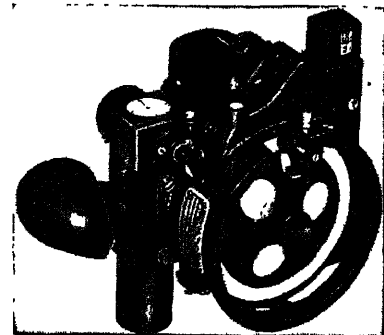
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From Page 28

The zinc reserves will last 20 years; copper and gold, 19; silver, 13; cadmium, 11; lead, 10; and vanadium, eight. The domestic reserves of manganese, platinum metals, antimony, mercury, tungsten, tantalum and chromite are even lower. Nickel and tin are not produced commercially in the United States.

Among the non-metals, all especially important in times of war, there is an unlimited reserve of nitrates and salt, enough bituminous coal and lignite for over 40 centuries, and sufficient anthracite for 187 years. Phosphate rocks for fertilizer and chemicals are in a six-century supply. Potash is more limited, but it will last nearly a century, it is estimated.

Sulfur reserves face exhaustion in 36 years. It is an important material, the basis of most of the sulfuric acid widely used in many industries. Fluorspar, needed for the newly-harnessed fluoride chemicals, is sufficient for 33 years.

Known reserves of petroleum will be exhausted in 15 years, according to this estimate. The discovery of new oil fields, however, is expected, and the production of fuel oil and gasoline from coal, natural gas and oil shale is about to begin. The known natural gas will last 55 years.

Mica, long-fiber asbestos suitable for weaving, flake graphite, industrial diamonds, and quartz crystals for electrical apparatus are produced only in very small quantities in the United States. These are among the non-metallic minerals that should be stockpiled.

Science News Letter, July 12, 1947

YOUR HAIR AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as:
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Botanical Orphan

➤ CORN is a botanical orphan. The wild plants ancestral to most other grains, as well as to such other cultivated plants as sugarcane, potatoes, melons, onions, tomatoes, apples, pears, grapes, strawberries, raspberries, cotton and tobacco are well known. They resemble their cultivated descendants mainly in being less productive, both in quantity and in individual size of product. Botanists and plant explorers have sought them out eagerly because sometimes they can be crossed with over-refined cultivated varieties to impart new disease resistance or climatic hardiness.

Wild corn, however, has never been found. Several times it has been suggested that corn is a descendant of a tall, robust grass called teosinte, found in Mexico and Central America, or of a hybrid between this and some other grass. The theory doesn't seem to stand up; it has even been suggested that the cart may have been put before the horse, and that teosinte is descended from corn, rather than corn from teosinte.

One thing the two plants have in common, that sets them apart from all other grasses: both have "tassels," that is, their male or pollen-forming flowers are borne in a branching, tree-like arrangement at the top of the stem. But it takes a long stretch of imagination to detect a resemblance between the corn ear and the female or seed-bearing inflorescence of teosinte.

That corn ear is the real stumper. No other grass has anything like it. It is obviously the product of long selection in cultivation, for like many other plant structures desirable from the cultivator's standpoint it is very bad from the plant's. With seeds firmly fixed in the cob, and

the ear sheathed in husks, it is about as ill-adapted for a natural dispersal of its seeds as can well be imagined. It can grow only where man plants it; corn is even more dependent on man than man is on corn.

Moreover, it has been that way for centuries. In very ancient tombs of the South American uplands, older than the Inca empire, pottery vessels shaped to look like corn ears have been found—and the ears are like those raised by the Indians of those regions today.

It is quite possible that the wild form of corn never will be found. If that is so, botanists will be hunting for it on the eve of Judgment Day. For they are a persistent lot.

Science News Letter, July 12, 1947

BIOLOGY-PHYSICS

Laboratory to Study Marine Biophysics

➤ MARINE biophysics and cancer are to be the two principal subjects of research in Donner Hall, a building of 64 rooms costing \$150,000, title to which has just been handed to the Institutum Divi Thomae by the Donner Foundation.

It is adjacent to Bradley Hall, present laboratory building of the Institutum in Palm Beach, Fla.

The Institutum Divi Thomae, with northern headquarters at Cincinnati, is a graduate research institution open to all scientists without respect to race, color or creed. It has been operating since 1935, and now has 14 affiliated units throughout the United States.

Science News Letter, July 12, 1947

BIOCHEMISTRY

Digestive Enzymes Aid in Lard Making

➤ PROTEIN-DIGESTING enzymes like pepsin and papain are used to loosen the grip of animal body tissues upon their fat, and thereby make lard production possible in less time and at lower rendering temperatures than those used in present practice, in the process on which patent 2,423,102 was granted to Dr. H. L. Keil, research biochemist for Armour and Company.

Science News Letter, July 12, 1947

Early *adobe houses* built by Indians in Arizona, New Mexico and southern California, were left in the natural color of the mud blocks to make them less visible to enemies; Spanish settlers introduced the white finish.

Books of the Week

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ADVENTURES IN MAN'S FIRST PLASTIC, The Romance of Natural Waxes—Nelson S. Knaggs—*Reinhold*, 329 p., illus., \$6.75. Collecting waxes is adventure enough, but their relationship to the progress of civilization and modern arts and trades must be understood to appreciate them.

ANIMAL NUTRITION—Leonard A. Maynard—*McGraw-Hill*, 2nd., 494 p., illus., \$5. Incorporating the many striking advances in nutrition, this book is principally for students of farm animal nutrition. References, because of the war and unavailability of papers, are only to work carried out in the U. S.

THE CHEMISTRY AND PHYSICS OF ORGANIC PIGMENTS—Lyde S. Pratt—*Wiley*, 359 p., illus., \$6. Providing a broad background of history, theoretical considerations of the relation between color and chemical and physical structure, raw materials, chemistry involved, structural types, and methods of testing known and unknown pigments, this manual provides the student with an appreciation of the factors involved in experimental investigation and industrial application.

EXERCISES IN ORGANIC SYNTHESIS—Jacob G. Sharpekin—*Crowell*, 60 p., paper, 75 cents. Dealing only with the aliphatic series, this handbook helps students select from general methods specific syntheses to solve their particular problems.

FUNDAMENTALS OF INDUSTRIAL ELECTRONIC CIRCUITS—Walther Richter—*McGraw-Hill*, 569 p., \$4.50. With a minimum of mathematics, this textbook aims to reduce circuits containing vacuum tubes to their more familiar elements, so that both engineer and practical man can analyze them and then design their own.

IG FARBEN—Richard Sasuly—*Boni and Gaer*, 312 p., \$3. This account of the far-reaching influences of IG Farben on manufacturing, economics, and politics helps explain the recuperative ability of German science.

LIGHTING YOUR PICTURES—Don Mohler—*Ziff-Davis*, Little Technical Library, 147

p., illus., 95 cents. A practical discussion of best lighting effects.

MAMMALS OF NORTH AMERICA—Victor H. Cahalane—*Macmillan*, 682 p., illus., \$7.50. Divided into families, all are thoroughly discussed with respect to life histories, habits, distinguishing characteristics, habitats, and range.

MINERALS YEARBOOK 1945—U. S. Dept. of the Interior—*Govt. Printing Office*, 1688 p., \$4. A review of the mineral resources and industries of the United States and their reconversion to peace, foreign min-

erals review also included.

RADICALISM AND CONSERVATISM TOWARD CONVENTIONAL RELIGION—Philip Morton Kitay—*Teachers College, Columbia Univ.*, Contributions to Education No. 919, 117 p., \$2.10. A psychological study of a group of Jewish college students.

TELEVISION—Alfred N. Goldsmith et al.—*RCA Review*, Vol. III (1938-1941); Vol. IV (1942-1946), 486 and 510 p., illus., paper, \$1.50, cloth, \$2.50. Collections of essays dealing with advances in television and the various fields connected with these advances.

UNIT PROCESSES IN ORGANIC SYNTHESIS—P. H. Groggins—*McGraw-Hill*, 3rd ed., 931 p., illus., \$7.50. A systematic presentation of the principles and practices of organic reactions as applied to their technical application.

Science News Letter, July 12, 1947

SEISMOLOGY

St. Louis Quake Was Local

Weight of water may have caused earth movement but strain must have been accumulating for long time before the recent rains.

➤ THERE is a possibility that St. Louis's flood-time earthquake was triggered by the weight of the waters, both in the river and saturating the earth from near the surface down to bedrock, stated Dr. James B. Macelwane, S.J., in a Science Service interview. The actual strain in the crustal rock, which the quake relieved, had been accumulating for a long time, so the flood cannot have done more than add the final straw.

It was a strictly "home-grown" earthquake, for it was felt with equal intensity throughout the metropolitan area, all the way from Florissant, Mo., northwest of the city, to East St. Louis and the other towns on the Illinois shore of the Mississippi. There seems to have been no sharply marked epicenter. Dr. Macelwane thinks that the waterlogged condition of the soil may have had something to do with this unusual uniformity of intensity over a considerable area.

"I had gone to bed but was still awake when the shock occurred, shortly before midnight. I recognized immediately what it was, but was not at all excited, because it was only a little earthquake," said Dr. Macelwane.

Despite its slight intensity, the quake wrote large records on the University seismographs. It made a one-inch trace on a short-period Wood-Anderson instrument, and a four-inch one on a long-period Sprengnether. Apparently it

failed to record itself at other seismological observatories even at moderate distances from this city, for no telegraphic reports have come in.

It seems likely, Dr. Macelwane added, that the focus of the earthquake, its actual point of origin, was at a fairly considerable depth. St. Louis is built on clay of no great depth, overlying limestone strata about a mile thick. Beneath this is granite, and it was in this crustal rock that the jarring break occurred.

The present earthquake apparently had no relation to the New Madrid area, where one of the most violent quakes in American history occurred in 1809, sinking the land surface and creating several new lakes.

Science News Letter, July 12, 1947

Traffic accidents on American highways are due to several factors, an expert states, average cars are run 1,000 miles a year more than before the war, the average car is older, and highways are wearing out faster than repaired.

U. S. Civil Aeronautics Administration is consulting the aviation industry with a proposed order standardizing airport runways as to lengths, widths and ground strength for different types of use.

On an average, one traffic accident in every 24 is fatal in darkness, and one in 37 in daylight.

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☼ **BROOMS AND POT-SCOURERS** are made with neoprene rubber sponge heads which resist wear and can hold plenty of suds. The brooms sweep without raising dust or scratching waxed floors.

Science News Letter, July 12, 1947

☼ **ATTRACTIVE** plastic tray for serving food may be used also as a drain board when washing dishes. The center of one end of the tray is curved gracefully downward, forming a draining lip to fit over one end of a sink or to act as a support to hold the gadget level when set on a table.

Science News Letter, July 12, 1947

☼ **SIX-COLOR** mechanical pencil holds the almost unbreakable leads within an ordinary-sized barrel where they are quickly selected by simply adjusting a sturdy metal clip attached to the head. Instant lead selection is afforded by small colored dots imbedded in the pearl-gray shatter-proof barrel.

Science News Letter, July 12, 1947

☼ **MYSTERY RADIO**, called an electronic toy, resembles a small earphone, and operates without tubes, battery or electric current. Its two wires lead to a ground and antenna respectively. In a frame house, a bed spring can be used as the antenna. The radio receives the nearest local station.

Science News Letter, July 12, 1947

☼ **LENS ATTACHMENT** for cameras



permits the user to achieve any degree of soft focus simply by turning the calibrated ring which can be noted in the picture. It automatically enables anyone also to control diffusion, it is claimed, obtaining any degree from razor-sharp to misty-soft.

Science News Letter, July 12, 1947

☼ **FOLDING DOORS** and walls are made on a fire-resistant plastic coated fabric, in a series of vertical semi-rigid accordion pleats, covering a steel frame foundation. The partition, which slides along an overhead track, requires much less space than swinging doors.

Science News Letter, July 12, 1947

☼ **MOTION PICTURE** screen, a permanent fixture for theaters, lessens dis-

ortion and eyestrain, and gives an illusion of true depth. It consists of a steel frame with two seamless sheets made of very fine glass fiber, one laced behind the other to the curved steel frame. From theater seats, it appears to be flat.

Science News Letter, July 12, 1947

☼ **FLOW METER**, to record both direction and magnitude of the flow of water in a stream, has two rotors with their axles at right angles to each other. The flow of water turns the rotors, causing vanes to pass between electrodes, thus affecting an electric current and counting revolutions. Direction is computed from the ratio of the two rotor speeds.

Science News Letter, July 12, 1947

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Question Box

AERONAUTICS

What plane has a "potential speed" of 1,700 miles per hour? p. 28.

ANIMAL PATHOLOGY

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ELECTRONICS

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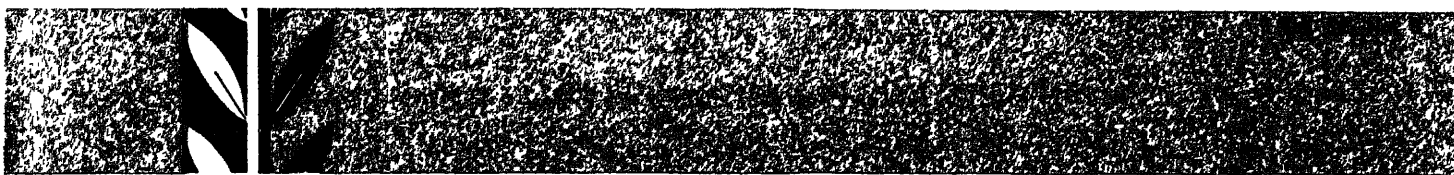
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What simple equipment is used in studying shock waves? p. 25.

Where published sources are used they are cited.



SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION

GENERAL SCIENCE

Scientists Best Defense

Leadership in science must take the place of military defense against atomic bombs. Research in medicine and biology is necessary, says board.

➤ "SCIENTIFIC leadership is the nation's best defense," a seven-man medical board of review has reported to the Atomic Energy Commission.

"The need for medical and biological research on the various effects of radioactive substances and atomic fission is both urgent and extensive," the report warns.

"It is urgent because of the extraordinary danger of exposing living creatures to radioactivity.

"It is urgent because effective defensive measures (in the military sense) against radiant energy are not yet known.

"From now on we shall mine, transport, process and use radioactive substances as sources of power, tools for investigation of biological processes, and for the treatment of disease. There will therefore be incessant danger in handling such substances and using their radioactive properties. The need for further research is extensive as well as urgent.

"As an explorer allows for unforeseen hardships and unpredictable events, the investigator must plan for extensively unforeseen eventualities. The number of radioactive substances is large; many have never been identified as existing in nature.

"Such substances call for suspicious study. The facts learned and the mastery obtained in the past four years acquire most of their immense significance not merely from their present state of development but from what they will lead to. As the sole possessor of the materials and the processes involved, the Atomic Energy Commission must continue and extend research for which it has the primary, and in the U. S. A. the sole responsibility.

"In terms of human life, this research must be based on medical and biological science."

Here are other highlights of the report:

For scientific supremacy we cannot depend on the memories of the men who worked together to produce the atom bomb and to protect the workers.

We must train oncoming groups of young men, year after year. The young scientists will replace present authorities

on 1. atom-splitting, 2. devising new ways of using atomic power in peace and war, and 3. searching for methods of protecting the workers and the civilian population.

Newly-discovered radioactive substances must be studied for their dangers and their possible disease-curing properties.

Steps should be taken to make isotopes, the chemicals produced by atom-splitting, available to foreign investigators.

The Atomic Energy Commission should cooperate with the U. S. Public Health Service and universities in research and in training young men to conduct it, so far as security permits.

Members of the board were: Dr. Robert F. Loeb, Columbia University, Chairman; Dr. Detlev W. Bronk, University of Pennsylvania, and Chairman, National Research Council, Dr. Wallace O. Fenn, University of Rochester School of Medicine and Dentistry; Dr. Herbert S. Gasser, Director, Rockefeller Institute for Medical Research; Dr. Ernest W. Goodpasture, Vanderbilt University; Dr. Alan Gregg, Director for Medical Sciences, Rockefeller Foundation; and Dr. A. Baird Hastings, Harvard Medical School.

Science News Letter, July 19, 1947

MEDICINE

Inhaling Amyl Nitrite Will Cure Hiccup Seige

➤ INHALING amyl nitrite, medicine which many heart disease patients carry with them, will cure hiccups, including the alcoholic variety, when all else fails.

Its use to cure hiccup of "unbelievable forcefulness" which lasted almost four days is reported by Dr. R. C. Nairn in *Lancet* (June 14).

The victim was a stoker on a small ship doing minesweeping off Malaya during the war. Dr. Nairn, then a lieutenant surgeon in the British Navy, first suggested all the old and well-tried methods, such as holding the breath, breathing in and out of a paper bag, pulling on the tongue, and eating or

drinking such things as sugar and eucalyptus oil or sugar and vinegar.

When none of these worked, the hiccuper was transferred to Dr. Nairn's ship for examination and further treatment. A mixture of oxygen and seven percent carbon dioxide was given by a special apparatus but did no good. A sleeping medicine and morphine and kaolin (a fine clay) were given, the latter to relieve any possible stomach irritation. The hiccuper fell asleep, still hiccupping.

He stopped hiccupping early in the morning, "much to everyone's relief," but half an hour after awaking and drinking a little fluid, the hiccupping started again.

Dr. Nairn was considering giving a general anesthetic, such as ether, or paralyzing the patient's phrenic nerve by injecting a local anesthetic (procaine).

"Before seriously contemplating these heroic procedures," Dr. Nairn reports, he made a mental survey of the drugs supplied to small ships. One anti-spasmodic had not yet been tried. This was amyl nitrite.

Inhaling the vapor from one ampule of this "worked like a charm." In less than a minute the hiccup stopped.

Science News Letter, July 19, 1947

PHYSICS

Glare-Reducing Headlamp

➤ AN AUTOMOBILE headlamp with its glare greatly reduced is the invention on which G. C. Singer of Brownsville, Texas, has received patent 2,423,525. Since direct rays from the luminous filament are responsible for most of the blinding glare in such lamps, he places directly before this, on the inside of the flat front surface, an opaque disk that is silvered on its inner side, to reflect back the direct rays. These strike mirror surfaces on other parts of the lamp's interior, and thus emerge bright, but diffused.

Science News Letter, July 19, 1947

PHYSICS

New Form of Bolometer

➤ FOR A NEW form of bolometer, extremely sensitive heat-detecting instrument, patent 2,423,476 has been issued to three physicists of the Polaroid Corporation, B. H. Billings, W. L. Hyde and E. E. Barr. Essential part of the instrument is a film of chromium and silver, deposited by evaporation on a very thin pellicle of nitrocellulose.

Science News Letter, July 19, 1947

NUCLEAR PHYSICS

Atomic Frontier Advanced

Cyclotron at Berkeley has knocked 22 and possibly 30 particles out of atomic nuclei. Over a hundred radioisotopes have been discovered.

► THE STUFFING literally has been knocked out of the atom, and the atomic research frontier has been advanced far beyond the knowledge from which the atomic bomb was fashioned.

Breathtaking results of ultra high frequency bombardments with the giant University of California cyclotron at Berkeley were disclosed for the first time to the Pacific coast section of the American Physical Society.

The 4,000-ton nuclear destroyer has knocked 22 and possibly as many as 30 particles out of the atomic heart or nucleus. A hundred or more new radioisotopes are in prospect, elements have been transmuted 16 steps down the periodic table and a host of new highly complex problems posed for scientists.

Research sponsored by Atomic Energy Commission as part of its peacetime program was reported by Drs. Glenn T. Seaborg and Isadore Perlman, who were aided by Drs. B. B. Cunningham, H. H. Hopkins, Manfred Lindner, D. R. Miller, P. R. O'Connor, and R. C. Thompson.

Two or three particles are the usual number knocked out by prewar cyclotrons. In sample bombardment, arsenic, which is element number 75, was transmuted down to cobalt 54. When results can be studied more closely, the scientists may find 30 particles dislodged.

New Radioisotope Series

An entirely new series of one hundred or more radioisotopes of common elements which are lighter than stable isotopes is opened up by these bombardments. This is a greater number than resulted from the fission in the atomic bomb, which produced mostly isotopes heavier than the stable isotope of elements. In fission, nuclei are overbalanced with neutrons and such nuclei tend to decay up from the stable isotope. Iodine fission isotopes included iodine 131 and higher, while stable iodine is 127.

Few lighter isotopes were produced before ultra high frequency bombardments, which create transmutation products tending to be overbalanced with protons after removal of many neutrons.

Such nuclei stabilize by converting protons into neutrons and in losing charge decay downward. For example, a new light isotope is iron 52 produced from the bombardment of copper. Previously no isotope of iron lighter than the stable isotope 54 had been produced.

Drs. Seaborg and Perlman said that many new isotopes useful for tracers for uses not now existing may now result.

As many as 30 different radioisotopes were created in one bombardment, some new, some familiar. Different rates of decay make identification highly complex.

In one case arsenic bombarded by alpha particles or helium hearts produced chlorine, 16 steps down the periodic table. Prewar cyclotrons transmuted elements up or down one or two elements.

With simpler patterns of lower energy range, transmutation routes almost always can be predicted. But the new leap down the periodic table opens up alternative routes, primarily because several charged particles are knocked out. Scientists must now set to work on a new set of principles to predict new phenomena.

The fission of uranium with deuterons and alphas was also reported. This resulted in wider spread of fission products than with slow neutrons, and more symmetrical splitting with fission products bunched in center of periodic table.

Cloud chamber photos made by Dr. Wilson M. Powell of nuclei disintegrating under impact of 100,000,000 electron volt neutrons from cyclotron were also shown. Five-pointed stars resulted, similar to cosmic ray phenomena. These stars represent most complete man-made disintegration of atom ever achieved.

Science News Letter, July 19, 1947

EDUCATION

Chemist To Head UNESCO Science Regional Offices

► AN AUSTRALIAN chemical engineer who was born in Memphis, Tenn., will supervise the three science cooperation offices of UNESCO being set up this year in Rio de Janeiro, Cairo and China.



TIMING CAMERAS—Electrically operated, this camera that timed the speed-champion Lockheed P-80R is accurate to 1/1000 of a second.

He is William E. Purnell of Sydney, who has specialized in rubber chemistry.

Science News Letter, July 19, 1947

GENERAL SCIENCE

Six American Scientists Join MacArthur's Staff

► THE NAMES of six leading American scientists who just departed for Japan have been revealed by the War Department. They went as expert advisors to General MacArthur's staff.

They will spend a month in that country, under the sponsorship of the National Academy of Sciences, evaluating plans submitted by Japanese scientific bodies for the democratization of scientific research in Japan. Each will report in his own field to the Economic and Scientific Section of the Army staff in Tokyo.

The members of the group are Dr. Roger Adams, head of the chemistry department of the University of Illinois; Dr. Merrill Kelley Bennett of Food Research Institute, Leland Stanford University; Dr. William D. Coolidge, director emeritus of research, General Electric Company; Dr. William V. Houston, president of Rice Institute; Dr. William J. Robbins of New York Botanical Garden; and Dr. Royal W. Sorensen, electrical engineer, California Institute of Technology.

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MEDICINE

Radioactive Germs Made

Radioactive penicillin is also being prepared to trace bacterial action in the body. Material must be flown to laboratories because of short life.

➤ RADIOACTIVE disease germs and radio-active penicillin, the mold chemical that stops many of them, are being created in the National Institute of Health laboratories of the U. S. Public Health Service in Washington.

This is one reason for the flying atoms which, along with flying saucers, have been worrying airline pilots lately. The radioactive chemicals are being flown to Washington and to other laboratories from the atom bomb pile at Oak Ridge, Tenn., where they are made. The short half-lives of the radioactive chemicals require speedy transportation.

Atoms of radioactive phosphorus, potassium and other chemicals, however, are securely sealed in containers which will not let any of them escape *en route*. Atomic Energy Commission officials declared.

They delivered the thousandth shipment from Oak Ridge to Dr. Kenneth M. Endicott, U. S. Public Health Service. Except for the fact that it was the thousandth shipment from Oak Ridge, its arrival would have been part of routine operations for American Airlines' Knoxville to Washington flight. Other airlines operating out of Knoxville (Capital and Delta) have also been flying shipments of radioactive chemicals.

The radioactive germs and penicillin are being prepared so that scientists can trace both germs and their mold chem-

ical enemy through the body. How the body's own germ-fighting forces, technically termed immune mechanisms, act is one problem that may be solved through these studies.

The radioactive penicillin will go to the Public Health Service's venereal disease laboratory at the Staten Island Marine Hospital where penicillin was first discovered to be a remedy for syphilis. Radiopenicillin was produced by putting radiosulfur into the material on which the penicillin-producing mold is grown. It will not be used to treat disease but to give further information on how much penicillin is in the blood, how fast it is excreted from the body, whether some organs store more than others, and similar facts.

Knowledge of this sort, needed to determine proper dosages, has so far been gained from chemical methods that took much time to work out. With radiopenicillin and the possibility of making streptomycin and other antibiotics radioactive, scientists hope to gain such knowledge much more quickly in the future.

Radioactive potassium gives engineers a new tool for checking ventilation. It is being used at the National Institute of Health to check the ventilating system which is the main defense of men and women working with dangerous disease germs in the new infectious disease building.

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MEDICINE

Streptomycin for Plague

➤ STREPTOMYCIN and DDT, two of modern medicine's most powerful disease fighters, may help stop the outbreak of plague in Palestine, reported "definitely alarming" medical authorities there.

Plague victims are already getting streptomycin, if latest medical reports on this chemical from a mold have reached Palestine physicians. That report, said Dr. Karl Meyer, University of California epidemiologist, showed that streptomycin controlled pneumonic plague in 90% of mice.

"There is every reason to believe streptomycin will be equally effective in man if given early in the attack of plague," he stated.

Pneumonic plague is the most deadly form of the disease. It is caused by the same germs, however, as the bubonic plague reported in Palestine. And streptomycin stops the germs.

Substantial amounts of streptomycin have been exported to Palestine every month, license applications at the Office of International Trade show. So doctors there will be able to use it.

Plague germs are carried from rats to man or from human patients to other humans by fleas. DDT will kill the fleas, just as it killed lice to stop the typhus fever epidemic in Naples when our troops first occupied that city during the war.

Killing the rats, standard plague-fighting procedure, will be more easily and effectively accomplished by two potent rat-killers developed during the war. These are Antu and 1080. The latter is used only by professional rat-killers. The former can be used by householders.

Before the discovery of streptomycin, sulfadiazine was used to check plague in China.

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SCIENCE NEWS LETTER

Vol. 52 JULY 19, 1947 No. 3

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N. Y. C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439

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The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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ENGINEERING

Engineers Need Biology

To prevent harm to waterways and soil, engineers should know more ecology. Lack of knowledge leads to harm.

➤ ENGINEERS generally have little or no knowledge of biology, and this gap in their education often causes them to do harmful things unwittingly, declares Dr. Paul B. Sears, professor of botany at Oberlin College and author of *Deserts on the March* and other books on conservation.

In *Science* (July 4) Dr. Sears points out some of the ill effects of engineering works that might be avoided if engineers had more knowledge of living things and the soils and waters in which they live.

Engineers, networking the country with highways, are interested in water only to get rid of it as rapidly as possible. This, declares Dr. Sears, "accelerates movement of water into main drainage channels in flood time and interferes with maintenance of ground-water level by removing water before it can soak in. Also, by speeding the movement of water in earth channels, it leads to roadside erosion and consequent lateral gullies into agricultural land."

Industrial engineers may do an excellent job in building wealth-creating factories, but when they arrange for dis-

charge of wastes into rivers they destroy wealth that is already there. One industrial plant, cited as an example, killed more than 200,000 fish in one summer month by pouring its toxic wastes into the Miami River.

Stream control, which is likely to be a very lively subject after this summer's disastrous floods, needs the broadest ecological approach to be really effective. This has been done in such places as the Tennessee valley. Yet the planners of a \$20,000,000 dam in 1935 rejected the services of ecologists, with the consequence that in a few years they were having to fight flood damage, and found their reservoir to be rapidly filling up with silt.

Present engineering-school curricula have no place for basic courses in ecology, which is the sociology of plant and animal life, and the sciences that deal with soils and natural waters. It is hard to see how such studies could be squeezed into the tightly packed schedules in today's highly standardized engineering courses. Yet without this knowledge, engineers will continue to do unintentional evil along with their good works.

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DR. CALDWELL—The death of Dr. Otis W. Caldwell means a loss to science and education.

Though we then lived in a county seat town, the nearest public library was thirty miles away. Even the best public library didn't possess much of the best reading material. Not much then existed, as compared with what may be had today.

The scope and nature of American education has changed. Everybody may now have an education provided he has a little of the necessary gray matter. We even waste a lot of educational time trying to educate a minority who do not possess the "makings," because a little education has become the shibboleth of social respectability. Anyway, our American education has produced millions of high school, college and university graduates, nearly all of whom can benefit through use of modern reading material. Educated men and women in all walks of life constitute a new reading public. It is new in size and new in the scope of its interests.

No aspect of human learning is more important than science. Its astonishing new knowledge appeals to almost everyone. The benefits to humans are hard to measure but are very great. And probably most important of all, the ways of working of scientists seem likely to affect thinking and action of people in general.

People understand much of our science these days. Atomic energy means something to most readers even though parts of it are yet unknown to those who know most. If those who write and who

EDUCATION

Progress—Read to Learn

The death of Dr. Otis W. Caldwell on June 5 has ended a notable career in science and education. Dr. Caldwell was a leading biologist and for ten years head of the Lincoln Experimental School of Columbia University Teachers College. He was a powerful force in the new mode of education in this country.

At the time of the annual meeting of Science Service, Dr. Caldwell, who was a trustee of Science Service, nominated by the American Association for the Advancement of Science, prepared for delivery over the CBS network an evaluation of the public's uses of printed pages about science. Because of illness Dr. Caldwell was not able to deliver this on the radio and SCIENCE NEWS LETTER now publishes it as a final message from Dr. Caldwell.

➤ DURING my three-quarters of a century a lot of things have happened to the reading public. In our childhood we were constantly urged to *learn to read*. Ever since those childhood days we have been *reading to learn*. Indeed no child has made much progress until his emphasis on learning to read has shifted to reading to learn. Each one of us should always be improving his reading habits, and many adults constantly do so. Reading with enjoyment, understanding, and growth in culture has become a major interest of millions of people.

I well remember when my reading was restricted to "The Youth's Companion," "The Herald and Presbyter," the Sunday school leaflet, a weekly newspaper and an occasionally borrowed volume of Dickens or other novelist.

speak will always be as clear as they can be, plenty of folks will understand. New words are not a bother whenever new ideas are reused as the vital things for which new words exist.

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OCEANOGRAPHY

Longest Mountain Range To Be Explored by Boat

➤ THE WORLD'S longest mountain range, that extends almost from pole to pole, is about to be systematically explored for the first time—and by boat. Thus far, men have had knowledge of its existence, but no one has actually seen more than its highest peaks.

This range is almost wholly under water, very close to midline of the Atlantic ocean; it is known as the Atlantic ridge. Top peaks are such islands as the Azores and Ascension.

The exploration will be conducted by an expedition in the research ship *Atlantis*, owned by the Oceanographic Institution of Woods Hole. Prime objective is to learn whether there are deep, eroded canyons in the flanks of the ridge. The expedition will also endeavor to learn the depth of its covering mantle of silt and obtain samples of this bottom material.

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MUD-DIGGING—To trap samples of ocean mud, this 10-foot long steel tube (behind middle man) is dropped over the side of the ship and plummets into the ocean bed through the pressure of an 850-pound lead weight (between middle and right men). A cross-section of sediment fills the tube, which then is hoisted to the deck.

NUTRITION

World Must Double Food

International cooperation is necessary and possible, states one of leading authorities on the world food problem. Prices must be stabilized.

➤ WORLD FOOD production will have to be doubled within the next 25 years, declared Sir John Boyd Orr, director-general of the Food and Agriculture Organization of the United Nations. It looks like a large order, but it can and will be done, he predicted.

Sir John, who is one of the world's foremost agricultural economists, spoke as the guest of Watson Davis, director of Science Service, on *Adventures in Science* over the Columbia Broadcasting System.

The alternative to bringing everybody in the world up to the American level of nutrition is not pleasant to contemplate, Sir John asserted. "Two world wars and a world depression are just a mild shake-up compared with what we are in for unless we can solve the fundamental problems of industry, agriculture and trade on a world scale."

The speaker was confident that a program of international cooperation to increase food supplies is possible even though international action in certain other fields has been having its difficulties. For one thing, he pointed out,

this program will be based on facts and not on theories, and it is in the interest of everyone to see it succeed.

Preparations for such a program have already been started, and will be the subject of a conference of the FAO at Geneva next month.

Sir John outlined the steps that will be recommended:

"A Preparatory Commission of 17 nations was set up some months ago to study long-term world food proposals made by FAO last summer. Their report makes strong recommendations for a world-wide agricultural and industrial development program such as we have been discussing, plus international commodity arrangements to stabilize the prices of major agricultural products in the world market.

"That latter provision is intended both to protect consumers from too high prices in a period of shortage and to safeguard producers in a period of so-called surplus by helping to prevent the kind of slump that ruined agriculture between the two world wars. Under these proposals, reserves of certain foodstuffs would be built up to prevent famine and to be used in other ways to meet human needs, and farmers in the high producing countries would have an assured market at steady prices.

"The whole program would be under the general guidance of an advisory body to be known as the World Food Council, or Council of the Food and Agricultural Organization, which would keep an eye pretty continuously on the world food situation and be prepared to meet problems as they arose. The actual operation of the program would be up to the individual governments—but the machinery would be provided through which they could work constantly together."

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"Distillers feeds" are grain-yeast feeds resulting from the processing of grain by a distillery; in the production of spirits from grain only the starch is removed, with the proteins, fats and minerals remaining, further enriched by yeast used in the fermentation.

AERONAUTICS-MEDICINE

Aid for Crash Survivors

Rescue crews will be on call at all times to rush to victims of plane crashes. Food, water, plasma and other necessities will be dropped.

➤ CIVILIAN survivors of airplane crashes soon may have prompt and expert aid by plane and parachute. Rescue crews, organized and operated by the Army Air Forces for military purposes, will be in alert status at all times, ready to rush by air to a crash. They will be available for civilian crashes upon request.

The plans being worked out by the Army Air Forces are based in part on recent experiences in rescuing survivors of an Army plane crash in Nicaragua. Prompt action by Army officers is responsible for saving 13 lives that otherwise might have been lost, out of a total of 15 involved. More prompt arrival of medical aid might have saved one more. One man was never found.

Under the plan, it is expected that several rescue crews including paratroopers will be stationed at widely separated Army airports within the United States. There will be two in Alaska, one or two in Hawaii, two in the Caribbean area, and others elsewhere in distant lands.

Each crew will include a "paradoctor." This is an Army physician trained in parachuting. When he drops to a survivor he will carry with him the essentials for first aid. Special medical kits, each with its own parachute, will be dropped at the same time. They will contain medical supplies, plasma, water, food, vermin repellents and other essentials, including a machete to clear out brush for a helicopter landing or a pathway for carrying injured to other conveyances.

Each crew will contain two trained surgical technicians and two "survival experts." These are soldiers trained to combat the particular conditions in the area of the crash. They will be jungle troopers for jungle areas, and "Arctics" for northern Alaska.

At each station a crew will be ready at all times to take off immediately after call. Disassembled helicopters already loaded on cargo planes will be ready to follow, or the crew may travel in the plane with the helicopter. These will be landed at the nearest airstrip to the crash, and can be made ready for the air in a few hours.

In the Nicaragua mission, a Fairchild Packet (Army C-82) took off from Morrison Field, Florida, with helicopter aboard. Delay in take-off was encountered because the only Army paradoctor stationed in the United States was at Westover Field, Massachusetts. The plane landed on Managua airport, near the west coast of Nicaragua. There the helicopter was unloaded, assembled, and took off to Alimicambi, the airstrip nearest to the search area.

It was five days after the crash when Capt Pope B. Holliday of the U. S. Medical Corps, the mission's paradoctor, reached the first survivor by parachute. Under the new plan, with rescue planes and crews always in readiness, survivors should be reached in hours, not days.

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ENGINEERING

Two Fastest Submarines To Be Completed in '51

➤ TWO NEW American submarines, scheduled to be completed in 1951, will be the world's fastest underwater combat boats, the U. S. Navy revealed today. Construction has just been authorized by Congress.

They will be named the Tang and the Trigger, being successors of famous sub-

marines of the same names, (both lost in 1945), that took a heavy toll of Japanese shipping. The Tang will be built at the naval shipyard at Portsmouth, N. H., the other at an unannounced private yard.

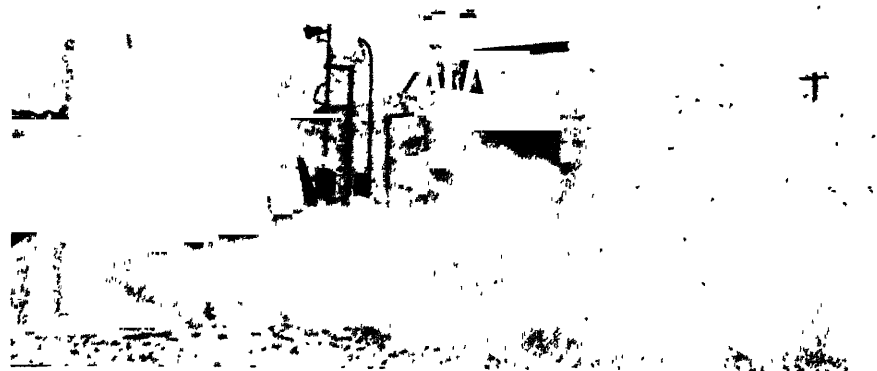
Hull, machinery and contract plans are being prepared by the Navy Bureau of Ships. All desirable enemy and Allied wartime developments will be included in their design. Final detail features, however, will not be fixed until near the end of their construction so that developments perfected during the next few years can be included.

They will be speedy and comfortable for crews and will have radical departures from conventional hull and machinery design. These are the only details announced. However, it is known that the U. S. Navy has two captured German U-boats in American waters for testing and evaluating, and much information about others.

Germany, during the war, developed submarines far superior in some respects to Allied underwater craft. The "snorkel" system was one of their most important achievements. It includes a breathing tube that can be used when the U-boat is relatively near the surface, but still well hidden under the water. Snorkel-equipped submarines are known to have remained submerged up to 70 days.

Another important German development was a streamlined hull to take full advantage of increased battery power. The Allies captured designs of a U-boat which would have an under-water speed of 24 knots, which is more than present American submarines can make on the surface. It was to be propelled with hydrogen-peroxide gas turbine engines.

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JATO—These rocket-like shells are attached beneath heavily loaded aircraft to provide additional thrust to get planes into the air in short spaces. The wartime secret of JATO fuel has been revealed: it is a black plastic mixture of a special type of asphalt, a light oil and a chemical oxidizing agent.

PHYSICS

Aluminum-Coated Mirror Aids Optical Instruments

➤ OPTICAL instruments using reflectors, such as some telescopes, will produce clearer images by use of new aluminum-coated glass mirrors with the metal on the front face. There are many other uses for the new reflector.

This new mirror has just been revealed by Libbey-Owens-Ford Glass Co. It is now in production by the Liberty Mirror division of the company. It is designed particularly for use in a long line of scientific equipment ranging from submarine periscopes to television receivers.

Putting the reflecting aluminum coating on the front surface of the glass assures a single reflection. When the coating is on the rear, as in ordinary mirrors, there is a double reflection: a bright one from the coated rear surface, and a dim one from the front surface of the glass itself. In conventional uses, the double reflection is harmless; in scientific instruments, it gives a slight undesirable blur.

In the manufacturing process employed in making the new mirrors, a method called thermal evaporation, a coating of hard quartz is deposited on the aluminum to insure durability. The film is found to withstand extreme temperatures from minus 60 degrees Fahrenheit up to 200 degrees. It is resistant to moisture and salt atmosphere.

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ETHNOLOGY

Aymara Indians of Andes Are Worst of Worriers

➤ THE WORLD'S worst worriers are the Aymara Indians, who live on a 14,000-foot-high plateau in the Andes, near Lake Titicaca. Some of their fretful customs are described by Harry Tschopik, Jr., anthropologist of the American Museum of Natural History, who has just returned with his wife, an archaeologist, after living in one of their villages for seven years.

Life is hard in the bleak, barren, wind-swept Aymara country, and their hardships seem to be reflected in the mental attitude of the people. They "appear not to like anybody, including each other." They worry constantly about the immediate future, and try to learn by divination the outcome of such commonplace things as going to market or raising potatoes. When a person dies, he gets

"blamed" for becoming a permanent absentee from his work. Children are coddled and petted until they are about three years old, but then are considered ready for such jobs as herding pigs.

Witchcraft is very common, both the black and white varieties. A woman of the village hired a professional black witch to "put a hex" on the Tschopiks. Both became ill shortly thereafter, which was of course credited to the witch's magic powers by the Aymara, who subjected them to a strict boycott. To make it possible to continue working there, the Tschopiks had to hire a white witch and go through a tedious "de-hexing" ceremony. Then the woman who had started the trouble lost face and left town.

About the only fun the Aymara ever get seems to be from drinking "tinka" at funerals and on holidays. Formula for tinka: one quart alcohol, one quart water, one handful coca leaves (source of cocaine), one handful cigarette butts. Taken straight, without chaser.

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ASTRONOMY

Poland Receives Gift Telescope from Harvard

➤ A FAMOUS Harvard telescope that has photographed over 100,000 stars has arrived in Poland as a Harvard gift, to become the chief instrument of a new observatory at the birthplace of Copernicus, famous astronomical pioneer.

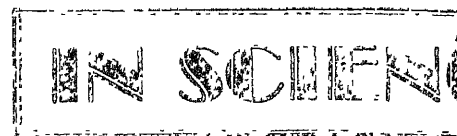
Dr Harlow Shapley, director of Harvard College Observatory, announced that the famous eight-inch Draper telescope has been received in Torun, Poland, by Prof. S. Dziewulski, leading Polish astrophysicist.

A major step in restoring Polish observatories destroyed by war, the Draper photographic doublet instrument was specially rehabilitated and equipped for an important program of Polish research on star colors, temperatures and chemical compositions.

The telescope will be the nucleus of the new Copernicus observatory at Torun, where Nicholas Copernicus was born. Copernicus is the astronomer whose theory put forth in 1543 placed the sun and not the earth at the center of the system of planets.

At Harvard the Draper telescope provided spectrograms of 100,000 northern stars for the late Annie Jump Cannon's famous ten-volume Draper catalog of spectral classes, positions and brightness.

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AGRICULTURE

Floods Killed Ragweed With Corn Destruction

➤ FLOODWATERS that ruined millions of acres of lowland corn did at least one good thing along with all the evil they wrought. They also killed millions of acres of ragweed, whose pollen is the chief cause of hayfever in this country.

Tall ragweed flourishes best on muddy riversides subject to frequent flooding that prevents more permanent types of vegetation from getting a foothold. It also grows densely on the neglected patches of land in odd corners of railroad yards, around city dumps and on low-lying wasteland generally. Low ragweed is a dominant cornfield weed, along with cocklebur, which is perhaps the No. 3 hayfever pollen producer over most of the Midwest.

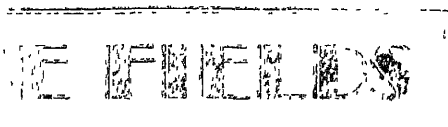
Along with the lowland cornfields, the wasteland habitats of the ragweeds have been drowned out, sometimes being under water continuously for weeks. Like the lowland corn, the lowland ragweeds have been either killed outright or so retarded in their growth that they will hardly blossom and produce pollen this summer.

This destruction of hayfever weeds on the lowlands will be at least partly offset by their greater growth in upland cornfields where continuous rain prevented effective cultivation during the spring weeks. Now this corn is too high to cultivate and the ill weeds grow apace.

Just what the final balance sheet of ragweed acreages will be there is no way of guessing now. It should be interesting, however, to compare this year's daily pollen counts with those of more nearly normal years.

The weedy cornfields will, of course, produce huge crops of ragweed seed and cockleburs to plague farmers and folk with sensitive noses next year and for several years thereafter—for part of the seeds of these troublemakers always lies dormant for from one to five years. By the same token, the riverside areas that bear no ragweed crops this year will have them in 1948, from the dormant seed now lurking in the soaked soil.

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ENGINEERING

Automatic Refrigeration Process Uses Ammonia

➤ A HOUSEHOLD refrigerator using calcium chloride, ammonia and heating gas, developed in Germany and said to be relatively inexpensive and satisfactory, was revealed by the U. S. Department of Commerce.

The liquid ammonia is the refrigerant. It passes within the cabinet through an evaporator where it is turned into a gas by the heat from the food in the box. It then goes through cells of solid calcium chloride where it is picked up by the chemical and condensed into a liquid again. The heat given up is removed by a mechanical blower.

The gas heat is used whenever the calcium chloride becomes saturated with the ammonia. It is turned on and off automatically. The heat vaporizes the ammonia and forces it into a condenser where it becomes a liquid to start anew through its circuit. The whole operation is automatic. No time switches are needed to control heating or other action.

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MEDICINE

Big Molecules May Cause Hardening of Arteries

➤ A NEW IDEA of the cause of high blood pressure and hardening of the arteries, one of the major causes of death, is suggested by a report from four South African scientists to Nature (June 28).

Big, inert molecules that flood the blood circulation might be the cause. They might be molecules of protein or of sugars or of a combination of fat and protein.

Africans with pellagra started this idea in the minds of Drs. J. Gillman, T. Gillman, J. Mandelstam and C. Gilbert of the University of the Witwatersrand at Johannesburg.

These Africans and others who were not suffering from pellagra developed a condition called cytosiderosis. Large quantities of iron pigment were deposited in their livers. Big, inert molecules which could be traced because of their iron content, were found to leave the liver in the bile. They were then absorbed by

the intestines and spread by the blood circulation.

The flooding of the circulation with these big molecules can result in a number of "extraordinary" reactions, the doctors found. Among these is hardening of the arteries.

The Johannesburg scientists are now trying to learn whether big molecules play a similar role in hardening the arteries of persons who do not have the pellagra and cytosiderosis in which the role of big, iron-containing molecules was discovered.

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PROSTHETICS

VA Exhibits Artificial Parts of Body for Use

➤ AN EXHIBIT of spare parts for the human body, to be used something like a sample showroom or library, was opened in Washington by the Veterans Administration this week.

A "reference exhibit of prosthetic devices" is the technical name for it. It will be permanent and is the only one of its kind in the world.

Here is how it will work:

Someone needs a spare part. It might be a leg or an eye or even hair for the head. He or his doctor, by consulting this reference exhibit, can find the one best suited to his needs. If he is a veteran, he can get the device through VA's "free choice of appliances" policy. If he is not a veteran, he gets it by an order to some private firm that makes it. By consulting the reference exhibit, he will be spared the trouble and sometimes disappointment of shopping around from one firm to another to find the best device for him.

Manufacturers also will use the reference exhibit to aid them in producing new or better devices.

Artificial arms, legs, hearing aids, aids for the blind, plastic eyes, wigs, cosmetic hands, spare parts for the face, wheel chairs, crutches and canes are among the 1,000 items, more or less, in the exhibit.

It took more than a year to assemble the exhibit. Members of the prosthetic appliance industry aided by contributing 95% of the items at no expense to the Government.

Experimental models, as well as those now in manufacture, are included. These are not available to veterans, though some may become available when they get past the experimental stage.

Science News Letter, July 19, 1947

ACOUSTICS

Even Heartbeat Disturbs Soundproof Room's Silence**See Front Cover**

➤ THE QUIETEST place on earth may be the ultra-soundproof room shown on the cover of this SCIENCE NEWS LETTER. Even a heartbeat breaks the silence. It was constructed by Bell Telephone Laboratories, Murray Hill, N. J., for acoustical research.

Walls, ceiling and sub-floor are lined with saw-tooth wedges of fiberglass to a depth of five feet. The working floor resembles the hitting surface of a tennis racket. It is made of high-strength steel cables only eight-hundredths of an inch thick, strung under high tension in two-inch mesh from the walls. The netting can support tons of equipment.

Science News Letter, July 19, 1947

SOIL CONSERVATION

Raindrop Splashing Starts Cycle of Soil Erosion

➤ FLOOD DAMAGE, though measured in terms of hundreds of millions of dollars, is by no means the only harm that the diluvial "forty days and forty nights" of rain wrought in the Midwest. Upland fields escaped inundation, but enlargement of old gullies and opening of new ones are obvious evidences of the terrible toll taken by water erosion.

Gullies are the final, catastrophic stage in the erosion cycle. Its beginning comes with the fall of the first raindrop on unprotected soil. Studies by W. D. Ellison, hydraulic engineer of the U. S. Soil Conservation Service, show that first stage in water damage to naked soil comes with the innocent-looking splashing of raindrops.

A raindrop is a triple enemy of bare soil. It is a plunging projectile that knocks soil particles loose. It is a solvent for plant-nourishing elements. It is a means of separating fine silts from heavier sand-grains, and humus from mineral particles in the soil's complex structure.

There is a special word for that latter process, that deserves to become as familiar a warning-sign as the word erosion. It is slightly longer, but easy to pronounce: elutriation. Soil subjected to elutriation by raindrop splashing loses value "in place", as contrasted with the damage due to erosion, which involves the actual removal of the soil. There is much elutriated soil in the Midwest this summer.

Science News Letter, July 19, 1947

BOTANY

Poisoning Poison Ivy

2,4-D and ammonium sulfamate sprays, easy to apply, rout the burning, blistering pest. Vine can be recognized by its many aerial clinging roots.

By DR. FRANK THONE

► POISON IVY, poison oak and poison sumac, that evil triad that for generations has inflicted misery on millions, have reached the end of their trail. Man, long their victim, now confronts them as a victor. Their eradication, long considered practically impossible, can now be accomplished almost as by waving a wand.

The wand in reality is the nozzle of a sprayer, and its magic is the beneficent magic of chemistry. Whole communities are joyously joining in the attack, routing these ill weeds out of home plantings and parks, off school and playground walls, away from summer camps and hiking trails. There is no longer any excuse for letting these nuisances survive in any place frequented by human beings.

Principal weapons in this war against these poisonous tyrants are 2,4-D and ammonium sulfamate. Both are wartime developments, and became available in quantity to the public only this year. Both are offered under a variety of trade names; but somewhere on the label their content of the essential killing ingredients will be stated.

They are easy to mix and easy to apply. All kinds of sprayers will serve. Depending on the size of the job, they may range from the hand-wielded garden variety to power-driven outfits used for fighting insects in orchards. Some commercial eradicators have introduced fog-machines, which are adaptations of the smoke-machines of wartime fame.

Appearance of Enemy

But before we attack the enemy we must know what he looks like and where he is. Poison ivy and poison oak are for present purposes the same thing: vines or low shrubs with three-parted compound leaves, clusters of inconspicuous greenish flowers in early summer, and soiled-looking white berries in fall and winter. Actually, the plants are all of vine form; what appear to be clustered shrubs are really straight-up branches of a vine-like runner just under the surface of the ground. Where

conditions are right for this runner to turn up and climb a tree or a wall with its myriad clinging aerial roots, the branches stick out sidewise.

Poison sumac looks pretty much like ordinary sumac, except that its fruits are pallid berries like those of poison ivy. It is found only in the wet, acid soil around the margins of bogs. Unless you have occasion to go into such places, there is little likelihood of your running into poison sumac.

Others Found Everywhere

But its evil three-leaved cousins get around practically everywhere. By common consent the species that grows on the Pacific Coast is called poison oak, while the highly variable forms found in the East are lumped together as poison ivy. The "Eastern" poison ivy, however, is not strictly Eastern; its range pushes far to the northwest and in Oregon overlaps that of the coastal poison oak. While no part of the country is entirely free of one or another of these three-leaved pests, poison ivy reaches its greatest abundance along the Atlantic seaboard, thinning out and hugging the ground more in the drier parts of the country.

Now that we have identified and located the enemy, we may proceed with our chemical bombardment. First, a word about our two types of munitions. Each has its advantages, and each its drawbacks. A common advantage is that both are good killers. They can be too good killers if handled carelessly, for they are as deadly to tomatoes or beans or dahlias or rosebuds as they are to poison ivy and other weeds. So you must be careful not to spray where you don't want to kill. While 2,4-D has the peculiar property of harming broad-leaved plants but not grass, ammonium sulfamate is a grass-killer as well.

Ammonium Sulfamate

Biggest advantage of ammonium sulfamate is its quickness; poison ivy is dead within 48 hours after spraying, whereas after 2,4-D treatment the leaves remain green (and poisonous!) for two or three weeks. On the score of cost,

however, 2,4-D has the better of the argument. A gallon of 2,4-D spray solution costs only one or two cents, whereas at present prices a gallon of ammonium sulfamate solution costs about 20 cents.

The form of ammonium sulfamate that was available last year caused some complaint because of its tendency to corrode metals, and hence damage spraying equipment. This has been corrected, in the compound now offered by du Pont under the trade-name "Ammate."

Balancing advantages and drawbacks of both weapons, L. W. Kephart, in charge of weed investigation for the U. S. Department of Agriculture, states, "For treating small areas, where expense is not a factor, I still prefer Ammate."

Of the several compounds of 2,4-D on the market, Mr. Kephart recommends the ester, because it is prepared in oil and is thus sprayed as an emulsion that sticks to the leaves even if rain does come a few hours after spraying. If you can be reasonably sure of fair weather for a while after spraying, however, the sodium and ammonium salts of 2,4-D will be satisfactory.

Spray in Sun

Best time to spray, whatever you are using, is on a warm, sunny day, preferably in the forenoon. That is when life processes in plants are going at top speed, which will result in the more rapid absorption of the poison spray, and its distribution throughout the tissues, even down into the roots. It is best if you can have a day that is windless as well as warm, for that will decrease the risk of the spray being carried onto the leaves of plants you don't want to kill.

If a poison ivy vine has climbed into a tree, you don't need to injure the tree by spraying its leaves while you are after the invader's. Just chop off the vine close to the ground. Presently it will start new shoots; then you can spray them and thus kill the root.

While one spraying will devastate a patch of poison oak or poison ivy, you can't expect a hundred-per-cent kill. There will be a few survivors, as there are after any kind of massacre. Also, there are likely to be seeds in the ground, that will keep on coming up for several years. So you will have to go over the area twice or thrice the first season, and make seasonal check-ups thereafter.

After you have got all your spraying done, be sure that your sprayer is very thoroughly cleaned. Remember, both types of ivy-killer will kill other plants, too, and if you leave a little 2,4-D or Ammate lurking in it when you want to use the sprayer for DDT-ing the insects on your vegetables or flowers—well, it will be just too bad.

When you remove the overalls or old clothes you have been wearing while among the poison vines, drop them, and whatever else you have on, into a tub and soak them well in strong suds. Wash your shoes, your leather gloves. And finally, wash yourself. Go over yourself with strong brown GI laundry soap, or its equivalent, for the first-over. Strong soap kills the poisonous oil with which you have unintentionally besmeared yourself while wading in the weeds. Mild soap won't do it. Remember, you have been dealing in poison, so you are "unclean" until you have thoroughly purged your skin and your clothes of it.

After that, you can revisit the scene of your late combat, prepared to do some highly enjoyable gloating.

Science News Letter, July 19, 1947



CLINGING VINE—Poison ivy climbing on trees and walls can be surely identified by the innumerable clinging aerial roots. Harmless ivies have similar roots, but their growth is far less abundant.

PSYCHIATRY

Psychiatry for Faithful

Science of helping people solve their problems is a medical specialty and does not undermine religion. Psychiatry's aim is to relieve human suffering.

➤ **PSYCHIATRY** is not undermining religious faith and morals. This is the considered opinion of America's leading psychiatrists, among them prominent Catholics.

More than a hundred psychiatrists, including psychoanalysts, meeting in Minneapolis as the Group for the Advancement of Psychiatry, are greatly disturbed by the current attacks on psychiatry. The attacks, they believe, reveal ignorance of the real aims and principles of psychiatry.

Four of the most prominent Catholic psychiatrists in the United States took issue specifically with "the recent series of public statements attacking psychiatry attributed to Monsignor Fulton J. Sheen of the Catholic University of America."

These psychiatrists are Drs. Edward A. Strecker of Philadelphia, Leo Bartemeier of Detroit, Frank J. Curran of New York and Francis J. Gerty of Chicago.

"It is a fundamental tenet of the Cath-

olic Church," they stated, "that there can be no conflict between true science and religion. We wish to state our emphatic agreement with this principle."

They point out that psychiatry is a recognized medical specialty occupying the same position as surgery or any other specialty concerned with the relief of human suffering. The Catholic Church has supported and sponsored the teaching of psychiatry at the Catholic University of America, at the Church's five medical schools and in its numerous hospitals. At the present time a number of Catholic priests who are physicians are being trained in psychiatry with the approval of the Catholic Church.

Contrary to the charge that psychiatry undermines morals, Dr. Bartemeier pointed out that psychiatrists recognize that for some patients, their improvement depends on strengthening their consciences.

The psychiatrist does not judge or censure his patients, saying, "you are

good or bad," but helps his patients to see and understand themselves as they really are in relation to their situation in life.

Science News Letter, July 19, 1947

MEDICINE

Methods Decrease Infant Deaths from Diarrhea

➤ **INFANT** deaths from acute diarrheas have been reduced from 30% to 50% by methods reported by two Argentine doctors at the First Pan American Congress of Pediatrics in Washington. The doctors are Mario J. del Carril and A. E. Largaia of Buenos Aires.

First step in their treatment is to give plasma to combat shock, and sugar and salt solutions to restore fluid to the dehydrated tissues of the baby. Next they give sulfa drugs or penicillin to fight infection. After these measures, "well chosen feedings," preferably of human milk, are given. Abundant vitamins and whole liver extract are also given.

Science News Letter, July 19, 1947

Sulfur mining in the United States follows a process patented nearly 60 years ago; essentially it consists of pumping superheated water down a drilled hole to melt the sulfur, then pumping the sulfur-laden water out.

Do You Know?

Dark, close-grained stone called *basalt* makes good ballast for railroads.

Canned *milk*, once opened, should be kept covered and cool, just as fresh milk should be.

Molasses is a common preservative used in farm silos for corn and other forage crops.

The U. S. *Army Corps of Engineers* is older than the Republic; it was established by an act of the Continental Congress on June 16, 1775.

Rooms in modern homes, with low ceilings to save cost, appear higher when sidewalls and overhead are finished with a high reflection paint.

Panama *honey-creepers* are beautiful, small, deep-blue birds that cling tightly to the stems of plants while they sip nectar from the flowers.

The *otter*, whose fur is highly prized, is an unusually large member of the weasel family; its webbed feet are better adapted for swimming than for travel on dry land.

Dropping a *fumigant* by a machine ahead of a plow has been found a successful method of controlling wireworm in the soil, ethylene dibromide solution is one effective substance used.

Brass fixtures in houses, after being cleaned in preparation for a coating of lacquer or other material, must not be touched with the hands; even a slight touch may leave a trace of oiliness from the pores of the skin.

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PHYSICS-ASTRONOMY

Projectiles for Research

➤ TWO WARTIME inventions, the long-distance rocket and the bazooka-type high-explosive charge, are being combined to hurl artificial meteors into outer space for purposes of pure research in physics and astronomy. Dr. F. Zwicky, professor of astrophysics at the California Institute of Technology, tells of the experiments in *Army Ordnance* (July-August).

The idea is to mount a shaped charge, with a metal lining in its conical cavity, on a super-rocket that will climb above practically all of the earth's atmosphere before the charge is fired. The metal lining will be converted by the intense explosion into one or more projectiles with velocities as great as 50,000 feet per second. This is about 20 times the muzzle velocity of a military rifle bullet.

These super-projectiles will be used as objects of research, such as bombarding the moon. The flashes resulting from their impact will be spectrographically analyzed, to find out what the moon is made of. Further refinements, and bigger rockets and charges, may make it possible to bombard still more distant targets, such as the other planets.

Another use of rockets suggested by Dr. Zwicky is the carrying of small photographic telescopes outside the earth's atmosphere. In this way it will be possible to obtain information about radiations from the sun and from more distant stars which is denied to observers on the ground with even the largest telescopes because the atmosphere absorbs a large part of all radiations. He mentions particularly a class of stars with temperatures higher than 100,000 degrees absolute. At present we know practically nothing about them because their radiations consist almost entirely of short-wave ultraviolet, which the atmosphere stops before it reaches the earth's surface.

Astronomical telescopes of the Schmidt type are proving more useful and accurate than radar in tracking rockets fired in the White Sands experiments, Dr. Zwicky states. They follow the rockets by the glow of their white-hot graphite rudders. They also have been used in recording the trajectories of metal particles hurled out by shaped charges in experiments on the ground.

Science News Letter, July 19, 1947

BALLISTICS

To Build Better Rockets

➤ RESEARCH which may provide a basis for coping with the air-friction heating of surfaces of supersonic missiles and planes, one of the factors placing a ceiling on speeds which can be achieved in sustained supersonic flight, is now under way at the University of California.

Engineers are beginning work with a verification of German research for the V-2 rocket. This research, while it fitted the needs of the V-2, was only a beginning in a field of growing importance, according to H. A. Johnson, engineer in charge of the Army Air Forces-sponsored project.

Present studies are being made in a small, subsonic wind tunnel, using flat plate models of metal and bakelite, to which are attached thermo-couples giving an extremely sensitive reading. Given the same conditions, the heat flow rates at supersonic speeds can be calculated from subsonic results. Next year the engineers hope to study air friction heat-

ing in a supersonic tunnel.

At the present time, Mr. Johnson explained, air travel above 600 miles per hour at sea level is not practical because the uncomfortable temperature of 120 degrees Fahrenheit is generated in the aluminum skin of an airplane. At 1,200 miles per hour at sea level a temperature of 200 degrees Fahrenheit would be generated, and this is about the limit of safety for metals now in use. With greater temperatures and stresses set up by sustained high speed travel, aluminum would tend to break up.

Change in temperature of the air at different altitudes is a factor in the research. At sea level the air temperature is 60 degrees Fahrenheit, while at 100 miles it appears to be about 570 degrees with a variation down to 70 degrees below zero at 35,000 feet. Thus the heat generated on the skin of a plane or missile would be influenced by the belt of air in which it traveled.

Science News Letter, July 19, 1947

PHARMACY

Better Drugs Foreseen

► NEW DRUGS that will outclass penicillin, streptomycin, the sulfa drugs and the war-born antimalarials will be developed by pharmaceutical science and industry, John S. Zinsser, president of the American Drug Manufacturers Association, predicts.

Mr. Zinsser, a chemist by training and president of Sharp and Dohme, one of the member companies of the association, spoke as the guest of Watson Davis, director of Science Service, on Adventures in Science over the Columbia Broadcasting System.

"Scientific knowledge grows by geometric progression," Mr. Zinsser said, explaining that he based his predictions of better drugs to come on the basis of the great developments in the war and prewar years.

Seed of Medical Advances

While it is the doctor who is in the front line in our every day fight against disease, the pharmaceutical industry provides him with the ammunition, the material, the tools and often even the "seed and seed money that start great new medical advances on their way to full flower," he pointed out.

The layman who is sick is told by his doctor what medicine to take and gets the prescription for it filled at the drug store. The many steps before that can be done were described by Mr. Zinsser as follows:

"The pharmaceutical industry bridges the wide gap between the purely laboratory scientist—be he physician, chemist, bacteriologist or pharmacologist—and the practicing physician at the bedside. Very often chemists, pharmacologists and other scientists must do vast amounts of laboratory work before a drug is even

ready for clinical testing by the doctor.

"After tests have proven a drug's merit, our chemical engineers must make the jump from a pilot plant to full commercial production. And then our control chemists must guard the identity, purity, quality and strength of the drug as it moves from our plant through the wholesaler, to the pharmacist and ultimately to the patient.

"Actually, those not familiar with our industry often fail to realize the vast amount of research work in which our chemical engineers and control chemists constantly are engaged. There is little point in discovering an important new drug if our engineers can't produce it on a commercial scale. And sometimes it may be just as important to find a more precise test for the potency of a drug as it is to find a new one.

"The pharmaceutical industry contributes heavily to some phases of research and entirely supports other phases. We make our grants to colleges, universities, research organizations and hospitals engaged in pure research. We underwrite research in our own laboratories. Very often we pay the full cost of clinical testing, developmental and control work. For a variety of reasons, by and large, our pharmaceutical companies are somewhat modest about divulging the extent of their contributions to scientific research in all of its phases.

Industry's Contribution

"However, a combination of unusual circumstances, including the last vestiges of wartime controls, has made public at least part of the industry's research bill on streptomycin, one of the new germ-killing chemicals from mold. We know that 11 pharmaceutical companies contributed over \$1,000,000 in less than a year to the basic clinical evaluation of this drug. This was done by grants to a National Research Council committee under the direction of Dr. Chester Keefer, of Boston.

"After this program was finished, a similar group pledged themselves to spend another \$1,000,000 in six months to determine the value of this drug as a treatment for tuberculosis—a project supervised by the Trudeau Society, the medical arm of the National Tuberculosis Association. This \$2,000,000 clinical budget for 18 months doesn't include the money spent for other types

of research necessary to bring this drug from Dr. Waksman's test-tube to the patient's bedside. The drug is relatively hard to make—developmental research has already paid off in increased yields and reduced prices. Control chemists had to start almost from scratch to work out precise new tests for this 'miracle drug'."

Science News Letter, July 19, 1947

INVENTION

Wire Fire Alarm Cable

► WHAT MIGHT be called a wire fire watchman, a cable that can be strung anywhere to sound the alarm when a fire starts, is the subject of patent 2,423,537, granted to D. R. Wheeler of Shreveport, La. Around a central wire is wound a ribbon-like layer of insulating material, with many perforations. Outside this is a sleeve of easily fusible metal, and finally an outer insulating layer. When a fire starts, the fusible metal melts and runs through the perforations of the inner insulation, thus completing the alarm circuit.

Science News Letter, July 19, 1947

The first sign of *rabies* in a dog is a change of disposition; friendly dogs lose their friendliness, and sometimes dogs that were formerly aloof become affectionate and gentle.

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Attack Ragweed Now!

➤ 2,4-D WAS ONE of a thousand or so chemical compounds on which experiments were conducted during the war, with the idea of ruining enemy crops by spraying them with it, from low-swooping airplanes. Hostilities ended before this particular kind of biological warfare could be put into practice.

Because it had been discovered that 2,4-D kills broadleaved plants but does little harm to most kinds of grass, it was first touted as a lawn-weed eradicator. It does very well at that, too. Then its virtues as a slayer of massed weed patches began to be discovered, and it is being used this season in combating poison ivy, Jap honeysuckle and similar pests.

Last season enough tests were made on the ragweeds with it to show its great usefulness in subduing these causes of most of American hayfever sneezes to demonstrate its practicability in this field of weed combat also. It has been put to

large-scale use this season, and should be in every place where ragweed or other hayfever pests grow.

Foresighted city fathers who 2,4-D'd their ragweed patches a month ago were able to save a good many dollars, for when the weeds are young they will succumb to very dilute solutions. Now that the weeds have grown tall and tough-leaved a stronger solution will be required—the regular one-to-a-thousand formula that is considered strong enough medicine for practically all weeds. This may not kill all the ragweed outright, but it will prevent it from coming into bloom and shedding pollen; which of course is the important thing.

No time is to be lost now. Both tall and low ragweeds come into bloom early in August in our northernmost states, and the wave of pollen-shedding (and sneezing) rolls southward, reaching the Gulf states after early frosts have checked ragweed growth in the North.

This is an especially opportune year for an all-out attack on ragweed growth in communities that recently had their troubles with high water. Low-lying land in railroad yards and "the bottoms" generally, which is normally a great place for tall ragweed, has had its weed crops pretty well drowned, leaving only the upland areas to be mopped up by the sprayer crews.

Science News Letter, July 19, 1947

PHYSICS

"Seeing Eye" Fuze Used On Rockets During War

➤ A "SEEING EYE" fuze, that operated on daylight instead of the radio waves of the proximity fuze, was used on rockets during the war, it is now disclosed. This optical proximity fuze is described in detail by Frank A. Zupa of the Bell Telephone Laboratories, *Army Ordnance* (July-Aug.).

Essential parts of the device were a ring-shaped lens built into its nose, a photocell, an amplifier and a selective switch. When the rocket was fired, the selective switch armed the fuze by throwing the amplifier into circuit.

While the rocket was in flight, daylight entering through the lens and striking the photocell maintained a certain level of current that did not activate the detonating mechanism. As the missile approached its target, however, some of the light was cut off by the target itself, and the resulting change in current level served to set off the explosive charge.

Science News Letter, July 19, 1947

MEDICINE

Pyribenzamine Ointment Relieves Itching Skin

➤ ITCHING SKIN can be relieved in most patients by an ointment containing one of the new hayfever remedies, Drs. Samuel M. Feinberg and Theodore B. Bernstein, of Northwestern University Medical School, report in the *Journal of the American Medical Association* (July 5).

Pyribenzamine is the chemical they used on some 50 patients. Other of the new anti-hayfever remedies might be equally useful in ointment form, they state. None of these chemicals, including pyribenzamine, is a cure for hayfever, but they give relief of symptoms to some.

Eczema was the cause of the itching in 33 of the patients treated with the new ointment. The itching was consistently relieved in 24 of them. Some had more relief from the pyribenzamine ointment than they had had from anything they had used on their skins, including local anesthetics.

Eight of nine patients with another kind of itching, technically known as pruritus ani, were also relieved by the ointment.

The ointment does not cure the underlying condition, which may or may not be an allergy, but it does relieve the itching which is often the most distressing symptom and in some cases the skin inflammation improves.

The idea of using pyribenzamine in an ointment for relief of itching came from finding that when given by mouth it greatly relieved the itching of hives due to allergy. Before having the chemical put into an ointment, the Chicago doctors soaked cotton in a solution of the chemical and tried that. This gave relief of an itching nose and upper lip which was the only unrelieved symptom of a patient they had been treating for ragweed-caused hayfever for years.

Science News Letter, July 19, 1947

CHEMISTRY

Wetproof Paper Process

➤ WETPROOF PAPER, impervious to most oils as well, is made by a process on which patent 2,423,555 has been issued to C. D. Ender of Wilmington, Del., assignor to the Hercules Powder Company. Chlorinated rubber is the principal ingredient applied to the paper as it is run through the machine in a continuous web.

Science News Letter, July 19, 1947

YOUR HAIR AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

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DENTAL CARIES—Bernard Gottlieb—*Lea and Febiger*, 262 p., illus., \$10. A thorough discussion of the pathology of dental caries, with excellent photomicrographs.

ELECTRO-PLATING—Samuel Field and A. Dudley Weill—*Pitman*, 5th ed., 483 p., illus., \$5. A survey of modern practice in electroplating including the analysis of plating solutions.

ESSENTIALS OF APPLIED PHYSICS—Royal M. Frye—*Prentice-Hall*, 322 p., illus., \$4.35. A textbook for a concise course which must cover topics not ordinarily found in a preparatory course. The latest concepts in physics are discussed, an appendix explains the minimum of mathematics necessary for a clear understanding of physics.

FOOD REGULATION AND COMPLIANCE—Arthur D. Herrick—*Revere*, Vol. II, 655 p., \$10. This volume discusses fully the subject of food adulteration under the law, administrative proceedings and enforcement and defense actions.

HOME-BUILT PHOTO EQUIPMENT—Walter E. Burton—*Ziff-Davis*, Little Technical Library, 156 p., illus., 95 cents. Practical suggestion of things to make and how to make them.

HUMAN BREEDING AND SURVIVAL—Guy Irving Burch and Elmer Pendell—*Penguin*, 138 p., 25 cents. A discussion of the field of population cause and effect and its ultimate effect on world peace.

INORGANIC SYNTHESIS Vol II—W. Conrad Fernlius, ed.—*McGraw-Hill*, 293 p., \$4. Giving detailed and tested methods for the synthesis of inorganic substances, this

volume has an index which is cumulative for Vol. I. Chapters are numbered according to the groupings in the Mendeleev periodic table and an appendix on nomenclature is included.

THE METAPHYSICAL SOCIETY: Victorian Minds in Crisis 1869-1880—Alan Willard Brown—*Columbia Univ.*, 372 p., \$4.50. This history of a little-known and vaguely understood society includes a study of the conflicts between religion and science in that period.

NURSE-PATIENT RELATIONSHIPS IN PSYCHIATRY—Helena Willis Render—*McGraw-Hill*, 346 p., \$3. Approached from the point of view of human relationships, this text gives an understanding of the psychiatric aspects of nursing care.

PHENOPLASTS, Their Structure, Properties, and Chemical Technology, High Polymers, Vol. VII—T. S. Carswell—*Interscience*, 267 p., illus., \$5.50. A compilation from the literature of the past 10 years on the theories and findings concerning the techniques of working with the phenoplasts and their chemical and physical properties.

RADIO QUESTIONS AND ANSWERS—Editors of Radio-Craft—*Radcraft*, No. 31, 64 p., illus., paper, 50 cents.

STYLE RULE—S. Stephenson Smith—*Wordsmith*, 23 p., spiral, \$1. A ready-reference handbook for writers, students, stenographers and all who write, covering grammar, sentence rhetoric, word usage, punctuation, uses of sources, and copy editing.

Science News Letter, July 19, 1947

times greater than that of the facilities being replaced.

Science News Letter, July 19, 1947

CHEMISTRY

New Insulant Gives More Room in Refrigerators

➤ **MORE ROOM** in refrigerators is becoming possible because a new insulating material permits thinner walls without loss of efficiency. The new insulant might be described as sand filled with air bubbles. Actually it consists of six per cent silica and 94% air.

It is made by treating sodium silicate with sulfuric acid. This makes a jelly consisting of a microscopically foam-like mesh of silica walls imprisoning droplets of water. The water is removed by heat and pressure, leaving only the silica cells filled with air. This kind of a structure is practically ideal from the heat-insulation viewpoint.

The new product was originated by Dr. S. S. Kistler of the University of Illinois, and will be manufactured by the Monsanto Chemical Company under the trade-name Santocel.

Science News Letter, July 19, 1947

TELEGRAPHY

Automatic Relay System

➤ **FUTURE** telegrams from surrounding areas passing through the Western Union central station in Philadelphia for transmission to distant points will encounter no delay, thanks to a new push-button system cut into the service recently.

This Philadelphia center will serve all telegrams to and from Pennsylvania, New Jersey and the area east of the Delaware river. By merely pressing buttons, telegrams will be automatically transmitted to their destinations.

In the system being replaced, telegrams received are rushed from receiving instruments to sending keyboards by messengers on roller skates. At the typewriter-like keyboards, the messages are put on the wire.

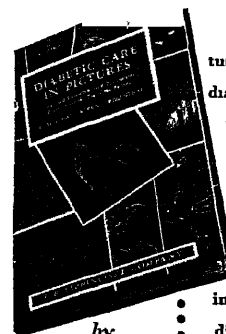
With the new installation, each message will be typed only once. That will be at its point of origin. It will be received in the Philadelphia relaying sta-

tion by a telegraph device known as a printer perforator, which simultaneously prints the message and punches combinations of holes in a paper tape.

In the central office, a clerk will read the destination on the tape as the message begins to come in. He then quickly presses a button bearing the name of the destination. The pressing of the button will cause the perforated tape to run through an automatic transmitter which will flash the electric signals to the desired terminal. There the signals will be automatically received in printed form ready for delivery.

There will be other high-speed centers at St. Louis, Richmond, Atlanta, Dallas and Oakland, Calif. The entire \$2,000,000 installation in Philadelphia, one circuit of which is now ready for use, will be ready for other circuits within a few weeks. The system gives a capacity three

to smooth the way for DIABETICS



"Diabetic Care in Pictures" was designed to smooth the way so that diabetes and its treatment might be completely understood. The result of more than 25 years of questioning in a nationally-known clinic—and the tested answer to all those questions. Simply written and lavishly illustrated by charts, photographs and drawings, it tells about the diet, measurement and injection of insulin, insulin reactions, acidosis and diabetic coma, blood and urine tests and necessary body care. The coupon below will bring a copy immediately.

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• New Machines And Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 371. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **ALUMINUM** storm windows and doors are strong, light-weight, trim and neat in appearance, and cut out little light because of the narrow frame. The door is the combination type in which the glass panels can be replaced quickly with insect screens. Windows can be removed easily for cleaning.

Science News Letter, July 19, 1947

⚙️ **TRI-VISION LENS** for three-dimensional photography has been perfected and has been delivered to the U. S. Navy for trial. It is eight inches in diameter. Photographs taken with it give an astonishing sense of depth without the use of stereoscopic spectacles. It uses range from portraits to motion pictures.

Science News Letter, July 19, 1947

⚙️ **SUPER ROCKETS** will travel faster and more accurately when equipped with a new ball-and-needle bearing device which generates a swirling flow of discharge gases. The propellant gases, detonated in a small chamber, push out through slanted jet openings to cause the rocket to spin as it travels.

Science News Letter, July 19, 1947

⚙️ **INDEXING DEVICE** for record



cards of standard or special sizes, holds them on a plastic revolving spool as shown in the picture. It requires no more space on an office desk than ordinary telephone. Cards are quickly inserted or removed; two faces are visible at the same time.

Science News Letter, July 19, 1947

⚙️ **MOBILE SPRAYER** for dispersing insecticides is designed for attachment to almost any vehicle having a gasoline engine, using the exhaust to supply spraying pressure. A tank attached to the vehicle holds the spraying solution; a flexible hose runs from it to receive the exhaust gases, then to the nozzle.

Science News Letter, July 19, 1947

⚙️ **WALL ELECTRIC CLOCK**, with a 14-inch-wide dial, has an electrosetting mechanism which makes resetting easy and accurate. After current interruptions, pulling a small ring at the bottom of the clock speeds up the minute hand to 300 times its ordinary rate. The hand is moved forward one hour in 12 seconds.

Science News Letter, July 19, 1947

You are invited to accept one of the few memberships still vacant in

Things of science

Membership is strictly limited to 10,000 and will be for at least the next nine months. This is America's most unique "club."

Each month you will receive a blue box full of actual scientific specimens—experiment with them, handle them, smell them, even sometimes taste them. Clip this address label and mail with \$4 check today for year's membership.

TO SCIENCE SERVICE
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Washington 6, D. C.

Enter my membership in the Things of Science Club. I enclose \$4.00 for one year's membership. Please send me the membership card and the first box of specimens.

Question Box

AERONAUTICS-MEDICINE

What more will a "paradoctor" do at the scene of a crash than administer first aid? p. 39.

AGRICULTURE

What good did the floods do? p. 40.

BOTANY

When should you attack ragweed? p. 46.

How can you get rid of poison ivy? p. 42.

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ETHNOLOGY

Who are the world's worst worriers? p. 40.

GENERAL SCIENCE

What is our best defense against atomic bombs? p. 34.

MEDICINE

What is thought to be a cause of hardening of the arteries? p. 41.

Why do radioactive germs have to be flown to research laboratories? p. 36.

NUCLEAR PHYSICS

How many particles have been knocked out of the heart of an atom? p. 35.

OCEANOGRAPHY

Where is the world's longest mountain range? p. 38.

PHYSICS-ASTRONOMY

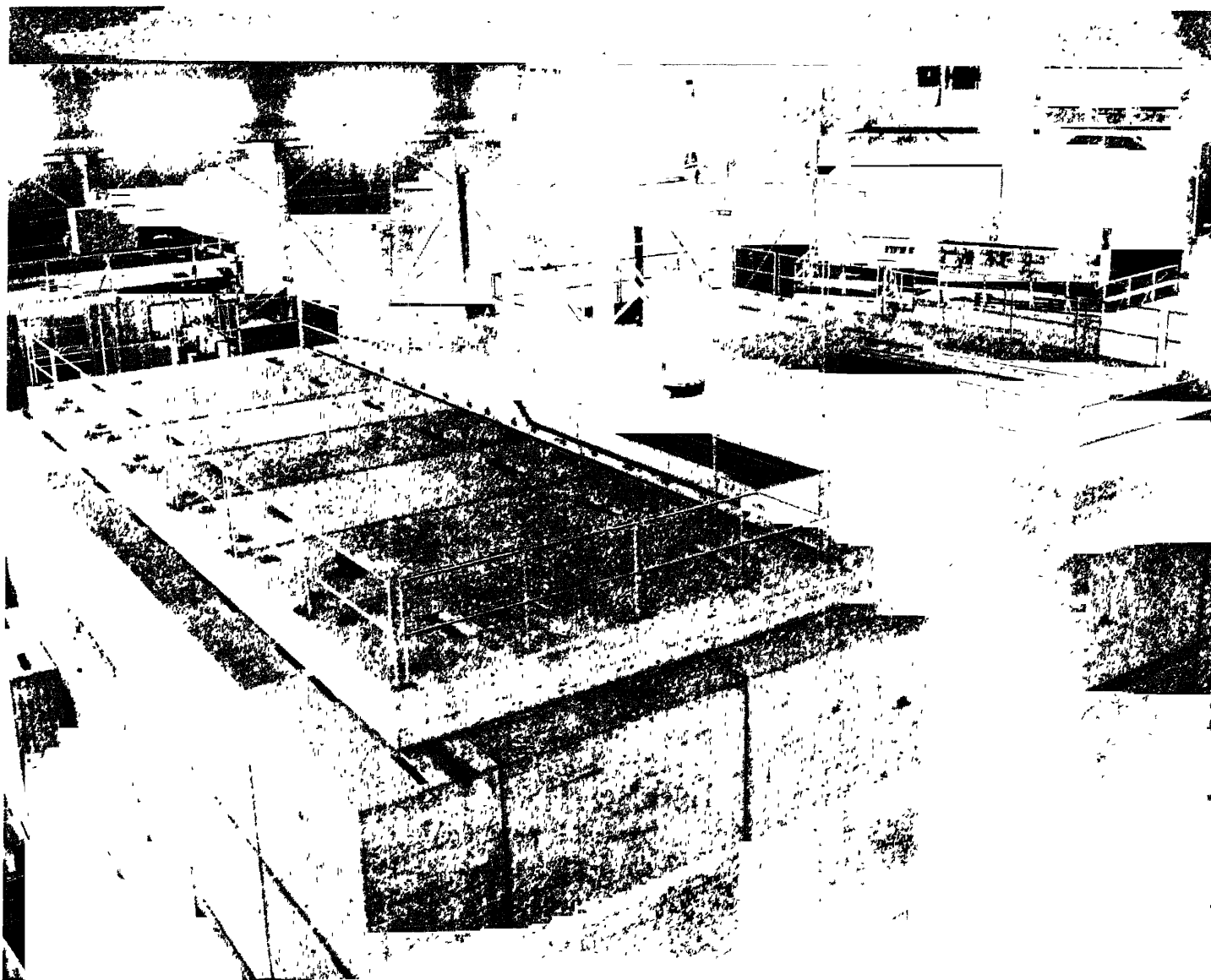
For what will artificial meteors be used? p. 44.

Pictures. Cover, Bell Telephone Co.; Lockheed Aircraft Corp., p. 35, National Geographic, p. 38; Texas Co., p. 39; Science Service, p. 43.

Where published sources are used they are cited.

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SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION

MEDICINE

Cramped Before Birth

Dislocation of hip, club foot, and other deformities can be traced to cramped positions of the baby in the womb. Some of these abnormalities can be corrected.

➤ WHEN A BABY is born with deformities such as clubbed-feet, dislocated hip or back-knee, it may be due to the position he had to take in his rather cramped quarters before birth, Dr. Charles Chapple of Children's Hospital, Philadelphia, told delegates to the Fifth International Congress of Pediatrics in New York.

The so-called congenital dislocation of the hip, he declared, is not really a dislocation, although hips can be dislocated before birth. The one called congenital, Dr. Chapple stated, is really only a persistence of the cartilage state of the hip of the unborn baby. It has not ossified, or become bony, enough to support muscle pull and weight bearing. The condition is due to relaxation of the hip joint capsule to the point where it does not provide enough pressure stimulus for the conversion of cartilage to bone.

Although the baby's mother may not notice the condition, the doctor can diagnose it, usually after the first week when the initial relaxation period has disappeared. Pinning the diaper to the sheet to keep the leg and hip in proper position, called abduction, or a simple abduction splint will let the bone form very rapidly. If the condition is recognized and treated before the baby is three months or at most five months old he has a good chance to walk normally and early.

Before the baby is born, his body

movements are restricted by his close quarters within the womb. He cannot stretch his arms and legs and has to adapt to whatever position he is in as the womb wall encroaches on him. He does this by relaxing his joint capsules. Often an arm or leg is trapped.

After the baby is born, he still prefers the position to which he has become accustomed, uncomfortable as it may appear. This is true even when his arms are locked under his legs or the legs themselves are extended beside the face. Sometimes a joint has had to be dislocated for the baby to adapt to the available space in the womb. When this has happened, the baby is happier in that posture than after the dislocated arm or leg has been placed in its proper position.

This preference of the newborn baby for his position before birth, however contorted, is so obvious that Dr. Chapple calls these contortions "positions of comfort." Newborn babies will almost invariably fall asleep in them.

Maneuvering newborn babies into their "positions of comfort" as a routine examination position shows the probable mechanisms involved in deformities such as clubbed-feet, back-knee and abnormally short under jaw. It also explains otherwise unexplained stiffness of certain joints, since joints stretched before birth seem to become less elastic than normal for at least a few months after birth.

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world's largest rolled-earth-fill structure, containing about four times the material in the Denison Dam on the Red river between Oklahoma and Texas. This is the world's largest dam of this type at the present time, he stated.

Science News Letter, July 26, 1947

River Water Diversion

Diversion of water from one river to another was described at the same meeting as working like a blood transfusion into an ailing person by M. W. Torkelson of the Wisconsin Planning Board, Madison. In particular he described plans for taking water from the Wisconsin river to the Fox river for a period of about 120 days each year.

The Wisconsin river flows generally southward through central Wisconsin until it makes a westward turn and empties into the Mississippi. The Fox, to its east, finally empties into Lake Michigan. Its lower section is highly industrialized with factories that use great quantities of water. The plan is to supply the water needs of these factories during low-water seasons.

Under the scheme some 1,500 cubic feet per second of water would be diverted when needed. It would not be entirely lost to the Mississippi, however. It would make up in part for the water now drained from Lake Michigan to the Mississippi by the Chicago Drainage canal and the Illinois river. This shipping canal to the Mississippi takes from Lake Michigan about 1,500 cubic feet of water per second every day of the year.

Science News Letter, July 26, 1947

ENGINEERING

Diesel-Electric Cooling

➤ AN IMPROVED cooling system for diesel-electric locomotives is the subject of U. S. patent 2,423,929, issued to T. B. Dilworth of Hinsdale, Ill., and M. M. Schalla of Oak Lawn, Ill. They have assigned their rights to the General Motors Corp.

Air is admitted through shuttered louvers on the sides of the locomotive, passes the cooling radiators, and is vented through a short stack at the top by means of a blower. Thermostatic controls open the shutters as the machinery heats up, close them again as it cools off.

Science News Letter, July 26, 1947

CIVIL ENGINEERING

Dams for Domestic Needs

➤ CONTROL and utilization of water in arid and semi-arid regions must adhere to the principle that the highest use should be for domestic consumption and the growing of crops, the American Society of Civil Engineers was told at Duluth, Minn., by Col. W. W. Wanamaker of the Army Engineer Office, Garrison, N. D.

The army officer described the newly undertaken Garrison Dam project on

the Missouri river. The giant reservoir made by the dam will extend a distance of 200 miles upstream. The project is designed to adhere to the above principle. Its primary purpose is to capture spring floods, and release the water later for irrigation, also for navigation, power and stream sanitation. The use for power and navigation would be secondary.

The dam to be built will be the

RADIO

Talking into Your Radio

You will be able to operate a two-way radio into which you can talk by 1948. It will be neighborhood and short-range service.

➤ YOUR OWN personal radio—the kind you can talk into, not just listen to—is in the making. Sometime in 1948 you will be able to buy and operate, by permission of the Federal Communications Commission, a compact transmitter-receiver—if you really need this new “citizens radio service” kind of communication.

Fifty manufacturers and experimenters are actually talking on the allotted 460-470 megacycle band under experimental licenses. About 500 small portables are already in use by police, firemen, foresters, geologists and motion picture producers. Experience in the operation of widespread personal use of two-way radio without interference with other radio services is being obtained.

Radio engineering advances made during the war are helping to speed the day when such personal radio-telephone sets can be bought and when the FCC will allow them to be used. Printed wire circuits, in which metallic paint on plastic or ceramic plates replaces conventional soldered wires, will contract and lighten the new sets. Miniature tubes, such as used in the famous wartime proximity fuzes, will be the electronic hearts of some of the sets. Some of these tubes will replace three or more tubes of conventional prewar radio sets. Just as these radio advances are about to appear in more compact hearing aids and conventional FM radio broadcast receivers, so they will be basic to the citizens radio service sets.

The war surplus “walkie-talkies” dramatized in the war just won’t work in the new service. These sets were made to operate on radio frequencies that could be used in the war theaters overseas but can’t be used here at home because they interfere with marine, police, fire and other radio services. To change their frequencies would cost too much; it is cheaper to build new and better sets taking advantage of the improved methods of making radios.

Manufacturers are not yet ready to guess at what these citizens radio service sets will cost. Probably they will be in the price class with the better kind

of living room radio, but they will be rugged and finished for wear rather than primarily for looks. They will be portable and therefore lightness in weight will be desirable.

You can’t yet apply for a license to operate a citizens radio because the rules and regulations are not yet drafted by the FCC. The new service probably will not be legalized before early next year.

Some rancher who wants to talk to his home from his roaming jeep may be the number one licensee of citizens radio service. Or a doctor may want sets to keep in touch with his office as he makes his calls. The week-end skipper of a pleasure boat may be an early CRS applicant. And a lumbering company may wish to install a system of its own to keep in contact with crews in the woods.

Government officials working on the new system expect citizens radio service to become one of the largest branches of radio in many ways. It will be neighborhood and short-range service as the distance that it will operate over will not be large. Eventually there may be ways to call a special station within range that will relay the voice over regular telephone lines, thus extending the range of these little radio stations so that they can reach all parts of the world wherever telephone service extends.

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NUCLEAR PHYSICS

Concrete Covers Cyclotron To Absorb Dangerous Rays

See Front Cover

➤ THE GIANT new cyclotron at the University of California is now “buried” in a five-foot-thick sarcophagus of concrete which absorbs the dangerous radiation created during its operation.

As the intensity of the 100 million electron volt neutron beam is increased, the thickness of the wall will be doubled. Of all the substances tested, in-



ATOM SPLITTING—Cloud chamber photograph shows disintegrations of atomic nuclei caused by 100 million electron volt neutrons. The neutrons passing through the chamber cannot be seen, though their effect can be photographed. Each prong of the five-pointed star represents a particle being emitted from an oxygen nucleus disintegrated upon being struck by a 100 million electron volt neutron. The heaviest tracks are caused by alpha particles. The lighter ones are protons and electrons.

cluding water, paraffin, graphite, aluminum, lead and copper, only the latter was more effective than concrete. However, copper was impractical because of the expense.

The five-foot wall cuts the intensity of the neutron beam down to one hundredth its original strength, which is sufficient protection against the present intensity of the beam, according to Dr. B. J. Moyer, physicist in the radiation laboratory.

The cyclotron’s sarcophagus is composed of 98 concrete blocks, averaging 20 tons each and totaling about 2,000 tons. Its dimensions are 20 feet high, 65 feet long, and 55 feet wide.

The neutron beam is so powerful, however, that it can be detected faintly when a Geiger counter is held behind the concrete at the point the beam emerges from the cyclotron.

The 4,000-ton atom-smasher hurls atomic projectiles of 10 times greater energy than any previous heavy particle accelerator.

Science News Letter, July 26, 1947

A kerosene product known as *savasol* kills weeds and almost every garden vegetable except carrots; it is extensively used in carrot raising.

GENERAL SCIENCE

Science Foundation Closer

Only about one more legislative step is necessary to bring about the establishment of a National Science Foundation with funds for research.

➤ A NATIONAL science foundation should begin speeding basic research in America within a few months.

The passage of a national science foundation bill by the House on July 16 after about three hours of debate is almost the last legislative step toward the civilian agency to back science for peace and future emergencies in much the same way that science was applied to the war.

The bill as passed by the House differs in only a few major ways from the bill the Senate passed in May. An attempt to put into the House bill on the floor the provisions that would earmark a quarter of the expected appropriations for the tax-supported colleges in the various states was defeated 81 to 33. Since this provision favored by the land grant colleges was inserted in the Senate bill on the floor of the Senate, it is likely to be eliminated when the Senate and House conferees meet.

The key man in the actual operation of the foundation will be the director. The Senate bill provides that he be nominated by the President and confirmed by the Senate, while the House bill has him appointed by the foundation. The final bill may bow to the Presidential appointment, as a recognition that the foundation is a part of the executive branch of the government.

President Truman is known to be very strong in his opinion that the foundation should be an effective and responsible agency within the government. However, it is not expected that his preference for presidential appointment of the director would keep him from signing the bill even if the House provision is in the final version.

The bill itself does not appropriate any money. There may not be time for an appropriation this session of Congress. This will not necessarily stop the foundation from getting underway. Organizational funds could probably be transferred from some existing appropriation.

When the director has qualified and

been in office for 30 days under the bill, the foundation would take over what is left of the war-time Office of Scientific Research and Development. This agency received \$90,000 for the current fiscal year. While it is a mere pittance compared with the hundreds of millions it spent during the war, this sum would probably allow the foundation to get organized and save several precious months. In research, a few months of saving of time may be the difference between success and failure.

Science News Letter, July 26, 1947

CHEMISTRY

Ultraviolet Radiation Can Change 2,4-D's Power

➤ULTRAVIOLET radiation can change the plant-killing power of 2,4-D and the various commercial compounds in which it is usually sold. This has been demonstrated in tests made by Drs. Merle G. Payne and Jess L. Fufts of the Colorado Agricultural Experiment Station.

They exposed small batches of 2,4-D and half-a-dozen of its compounds to carefully adjusted amounts of ultraviolet irradiation. Then they made up solutions of both treated and untreated samples and applied them to pea seedlings used as vegetable guinea-pigs in their experiments.

In general, irradiation increased the killing power of 2,4-D and most of its compounds, although the record is spotted with cases where it had the opposite effect. The ammonium salt of 2,4-D was weakened in almost all tests.

These tests, the two researchers point out, were made on commercial preparations, because it was of practical importance to get an immediate answer. If chemically pure preparations had been used, the results might conceivably have been different; such tests are recommended.

The tests, Drs. Payne and Fufts add, "suggest a possible explanation of the variable results secured from uniform

trials of 2,4-D and similar compounds at different times and places. Since the amount of ultraviolet light reaching the earth varies with change in atmospheric conditions, altitude and season of the year, the herbicidal effects might be expected to vary accordingly. Field tests to settle this question are suggested."

Details of the experiments are reported in *Science* (July 11).

Science News Letter, July 26, 1947

The so-called "Santa Fe" architecture of adobe houses in the American Southwest originated in Indian homes built of sun-dried earth blocks, or of sticks and mud, long before white settlement.

SCIENCE NEWS LETTER

Vol. 52 JULY 26, 1947 No. 4

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5 00 a year; two years, \$8 00. 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439

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MEDICINE

Shots of Drugs "Aimed"

The same drug can be directed to any organ needing the treatment by "aiming" it. Particles are the right size for cells. TB treatment hinted.

➤ AN "AIMED SHOT" method of giving drugs with a hint that it may provide a method of treating tuberculosis, is being reported by Dr. Rudolf Degkwitz, of the University Children's Clinic, Hamburg, Germany, at the meeting in New York of the Fifth International Congress of Pediatrics.

By "aiming" the injections, one and the same drug can be directed exclusively either to the spleen, liver, lungs or bone marrow, according to need. The trick seems to be having the drug in such physical form that particles of it are the right size and shape to be taken up by the cells of the sick organ.

Aniline dyes dispersed in the form of very small spherical particles in water were injected into guinea pigs infected with tuberculosis. With weekly injections, the animals survive after six to seven weeks of treatment, Dr. Degkwitz reported, while untreated control animals die within this period of time.

Examination of tissues or single cells by means of polarized light, which showed crystalline or crystalloid struc-

tures within the cells, apparently gave the clue to the "aimed" injection method of treatment.

A particular group of compounds, water-soluble fats, within the protoplasm of cells, Dr. Degkwitz found, apparently favors crystallization while another group, water-soluble sugars and proteins, prevents crystallization.

With the aid of these two antagonists, spheres, needles, flakes and fibers of well-defined diameters may be produced from the same drug in the test tube by first allowing it to crystallize and then interrupting crystallization after a certain time.

When a drug is injected into the blood stream, spheres and particles of a certain diameter will be taken up in the liver, spleen or bone marrow. Needle-shaped particles with longitudinal diameters similar to red blood cells will remain in the lungs. Spherical particles injected into cavities (abdominal or pleural) will be transported by the lymphatic vessels and will accumulate in the lymph nodes.

Science News Letter, July 26, 1947

MEDICINE

Synthetic Cheer-Up Drug

➤ NEW MEDICAL weapon in the fight against mental sickness is a synthetic cheer-up drug that lifts patients out of depressions. Its use in 50 patients of whom 36 showed definite improvement is reported by Dr. G. Tayleur Stockings, Ernest Hart Memorial Scholar of the British Medical Association.

The drug is called synhexyl. It was synthesized by an American chemist, Prof. Roger Adams of the University of Illinois. Similar chemicals have been synthesized by Prof. A. R. Todd of Cambridge University and the Roche Research Department in England.

Synhexyl, also known as pyrahexyl, or parahexyl, is somewhat like cannabis, the drug extracted from the hemp plant. Under the name of hashish, cannabis has figured in romantic tales of the East throughout history.

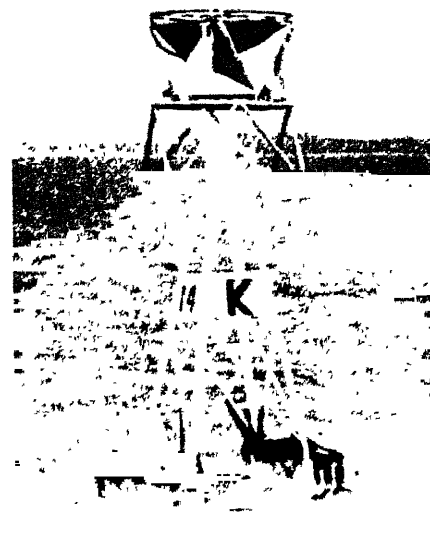
As a cheer-up drug, which doctors

call a euphoriant, synhexyl is more powerful, weight for weight, than cannabis, Dr. Stockings found from experiments on himself and a group of normal persons.

It is not very powerful as a pain-killer but under its cheering influence, patients were less disturbed by their aches and pains.

"An extremely promising" remedy but not a "permanent cure," is Dr. Stockings' verdict on the drug after trying it on patients. It is not a cure because its effect is not lasting and it must be given every day.

The patients took the drug in a capsule first thing in the morning before breakfast. The patients who were helped by it said they felt brighter, more cheerful and more confident. They showed more initiative and interest in work or other activities. Some had al-



REFLECTORS ON BUOYS — A buoy wearing a radar reflector can be picked up by the ship's radar at twice the distance than when the buoy alone is the target.

ready had electroshock treatments without being helped by them.

Inert, control capsules of exactly similar appearance did not have any effect on the patients, thus ruling out the possibility of the improvement being due to suggestion. Bad side effects from the drug were at a minimum and Dr. Stockings believes the drug could be given to patients who are not in a hospital.

U. S. Doctors Fear Hazards

Giving synhexyl, or parahexyl, to patients not in hospital would be completely contrary to the experience doctors at the U. S. Public Health Service Hospital in Lexington, Ky., have had with it. This hospital, popularly known as the "narcotic farm," has been carrying on extensive studies of morphine and many other drugs that might cause addiction.

"In a certain proportion of patients parahexyl sets off an acute, excited, temporary psychotic (insane) condition," Dr. Victor Vogel, director of the hospital said.

"It should therefore be given under closely controlled conditions."

Doctors here are not familiar with its use for treatment of depressions.

Science News Letter, July 26, 1947

MEDICINE

Benadryl Treats Hives

This new drug that is used for hayfever treatment relieves hives, or urticaria, by lessening itching and reducing swelling. It is given by mouth.

➤ BENADRYL, a new drug that has come into use in treatment of hayfever, is now pronounced "highly effective" in the treatment of hives.

Drs. Paul A. O'Leary and Eugene M. Farber, of the Mayo Clinic in Rochester, Minn., report to the medical profession through the *Journal of the American Medical Association* (July 19), that some patients who have had chronic hives for years, trying unsuccessfully a large array of therapies, were relieved within a few hours by swallowing small doses of Benadryl.

The drug was also very effective in acute cases of urticaria (which is what doctors call hives) caused by some medical injection or something a person has eaten. Usually an attack of such temporary hives subsides in a few days or weeks, but relief from the itching occurs in 20 to 60 minutes after the first dose of Benadryl is taken and the swelling is reduced in 2 to 6 hours.

In 35 patients with such acute hives, 20 were completely relieved in one to two days, 12 were improved with itching reduced and fewer and smaller wheals and three patients were not benefited.

Those with chronic hives must continue to take the drug to prevent the trouble from recurring. Of 75 chronic urticaria patients, 48 were entirely relieved while they were taking Benadryl, 17 had fewer lesions and less itching, and 10 obtained no benefit. A third of the patients had some harmful reactions to the drug, but only a few were sufficiently severe to stop the use of the drug.

Two other conditions that involve skin swelling and produce stiffness and inability to move one's fingers responded to Benadryl treatments. These ills are known as scleroderma and acrosclerosis.

The drug is given by mouth and Drs. O'Leary and Farber recommend that the treatment should begin with small doses administered three times a day, increasing gradually to discover what regular dose is needed to relieve the condition.

Benadryl is a white powder that has the chemical name, betadimethyl aminoethyl benzohydril ether hydrochloride, and it is manufactured by Parke Davis and Company.

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AERONAUTICS

Twin-Engined Helicopter Carries Twelve Persons

➤ THE U. S. ARMY has a new helicopter. It is its largest craft of the helicopter type, and can carry 10 passengers in addition to pilot and copilot. It features overlapping rotors.

It is of all-metal construction, a twin-engine affair, with two sets of rotors placed relatively close together and lifting blades that overlap as they turn, somewhat like the blades of the ordinary household egg-beater. This arrangement eliminates the need for a separate rotor at the tail to counteract torque or any tendency to get off its forward course.

The new helicopter, to be known in military circles as the XR-10, is a product of Kellett Aircraft Corporation, North Wales, Pa. Flying tests have already been completed. It has a maximum forward speed of over 100 miles an hour, and a range of 350 miles at a cruising speed of 90 miles an hour.

While the best known helicopters are one-engine craft with limited passenger capacity, there are other twin-rotor helicopters. One is a Navy craft, built by the P-V Engineering Forum, Inc., Philadelphia. This is an elongated craft, resembling somewhat a suspended rowboat, with rotors at the front and rear ends. It carries a total of 12 persons, including pilot and assistant.

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BOTANY

Rubber Tree Seedlings Seem Immune to Disease

➤ RUBBER TREES that seem resistant to the destructive leaf-spot disease have been brought out of the jungles of Brazil by Prof. J. T. Baldwin, Jr., of William and Mary College, and introduced into cultivation at the Instituto Agrônomo del Norte at Belém.

They belong to a different species from *Hevea brasiliensis*, the disease-susceptible plantation rubber tree. Their botanical name is *Hevea rigidifolia*; the species is not nearly so abundant as its cultivated cousin.

As actual yielders of latex, the new trees have little value. However, because they can be crossed with the plantation rubber tree species there is hope that they can be used in breeding to render the latter more resistant to leaf-spot disease.

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AAF'S LARGEST—Army's new 12-person helicopter, all metal, has rotors that overlap as they turn much like the blades of an egg-beater; the Kellett XR-10 has speed of over 100 miles an hour.

ELECTRONICS

Plastic-Embedded Radios

Warborn plastic protects radios and electronic equipment potted in it. NBS casting resin was used to house printed wire circuits.

➤ "POTTED" radios and electronic equipment, embedded in a plastic for protection against rough handling and atmospheric conditions, will open new fields for electronic devices in industry and the home, scientists at the National Bureau of Standards predicted.

The forecast was made with the disclosure of a secret warborn plastic, developed for "potting" electronic circuits. One use of the plastic was to house the flat, printed wire electronic circuits of the radio proximity fuze.

The clear, transparent plastic is called NBS casting resin. It meets the special mechanical and electrical requirements of a material for shielding delicate tubes and circuits without interfering with the operation of the electronic equipment.

Six different chemical compounds are used in making the plastic which may one day hold your own pocket radio or hand-sized radio sending and receiving set.

In casting, or "potting," a radio or electronic circuit, the liquid casting resin is poured over the circuit in a container. Curing in an oven converts the liquid plastic into a smooth, clear solid.

When glass tubes are to be embedded in the plastic, the tubes are protected by rubber jackets or other covering before being cast.

NBS casting resin was developed by chemists P. J. Franklin and M. Weinberg of the Bureau of Standards.

Protected by the casting resin, now-fragile electronic devices can find many more uses. As well as rigidly embedding the circuits, the plastic provides excellent electrical insulation.

In addition to small radios, which could be protected by the plastic and tuned by a pin or screw, other applications predicted for the casting resin include hearing aids and subminiature electronic control devices. In heavy industry, the transparent material can be used to shelter high-impedance control devices. NBS casting resin shields the circuits from vibration, acid fumes, high humidity, salt spray and other conditions which are encountered in some

industries.

The casting resin is nearly one-third 2,5-dichlorostyrene by weight, with slightly more than 20% each of poly 2,5-dichlorostyrene and styrene monomer Hydrogenated terphenyl and polystyrene each form more than 10% of the plastic's weight, with one-half of one percent of a solution containing 60% divinylbenzene

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BIOCHEMISTRY

Thyroid-Slowing Drug Grows Longer Feathers

➤ CHICKENS can be made to grow sickle and saddle feathers two or three times as long as usual by feeding them a small quantity of the thyroid-slowing drug, thiouracil. These exceedingly long feathers are very narrow. Often the feather is twisted so that parts of both the front and back can be seen at the same time.

To discover how the so-called "Japanese long-tailed" fowl was induced to grow such extraordinarily long feathers, Prof. Mary Juhn and Prof. M. A. Jull, department of poultry husbandry of the University of Maryland, experimented with the diet of several hybrid fowl. The greatest increase in length occurred in the long, curved sickle feathers and near-by back feathers known as saddle feathers.

When one of the roosters was six months old, they pulled out several typical feathers for later comparison, then placed the fowl on a thiouracil diet. As little as one-half per cent of the drug by weight was added to the regular mash on which the bird had been fed. Within nine months the two main sickle feathers, normally about 14 inches long, each measured 25.5 inches. And more important yet, they were still growing. Several months later one of the feathers had been lost, but the other had obtained its full growth of 33.5 inches.

Experiments with another cock showed that the saddle feathers produced by a bird that had been treated with thiouracil for a long time tended



DRUG-GROWN—Short feather is a mature sickle feather produced by a hybrid cock. The long sickle feather, measuring 33.5 inches, was produced by the same fowl during the time he was fed the drug.

to become longer than those grown when the rooster was newly placed on the diet.

Oriental birds, famous for their long feathers, receive special care and are closely caged, the scientists state in a report to the *Journal of Heredity*. They are fed with great care, being given unhusked rice, cabbage and other vegetables.

Although these birds have undoubtedly been bred to produce long feathers, some item in their diet, possibly cabbage, may have an effect similar to the drug and be important in achieving the feather lengths. Systematic pulling on the feathers probably would not increase the length, they suggest.

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INDUSTRY

Shipping Clams

➤ CLAMS can be shipped all the way from Alaska to the Pacific Northwest and arrive in edible condition, when treated by a process described by Prof. Cecil G. Dunn of the Massachusetts Institute of Technology. The shucked clams are first dipped into a mixture of brine and sodium benzoate, then packed in crushed ice. In this condition they keep their flavor and are free of spoilage for two weeks.

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MEDICINE

World-Wide 'Flu Epidemic Could Start at Airports

➤ A WORLD-WIDE influenza epidemic like that of 1918-19 may get started at one of the staging areas for international air travel, Dr. Stuart Mudd, professor of bacteriology at the University of Pennsylvania, warns

Conditions he saw on his own air travels to Russia last summer are the basis of his warning, appearing in a report in *American Scientist* (July 15).

He and Mrs. Mudd, he relates, were grounded by bad weather at Shannon and again at Gander. There they found scores of people from every part of Europe and America mingled in common rooms, all breathing the same confined air. As they breathed it, they exchanged microbes that each had harbored in his nose and throat, brought from home or picked up on his travels.

If any of these microbes belonged to a strain capable of causing disease, all the travelers would have been exposed to it.

Within a few days, as they continued on their travels, they would be spreading the disease germs all over Europe and the Americas. The spread would have been so far and so fast that it would be impossible to protect populations by vaccination. Some of the germs might be of a kind against which there is as yet no vaccine.

The situation, Dr. Mudd declares, is so serious that the World Health Organization and the international airlines should take action.

There is a remedy for it. This is to disinfect the air by ultraviolet lights or germ-killing vapors. "Adequate installations of ultraviolet radiation or of germicidal vapors in all staging bases," Dr. Mudd states, "would greatly reduce the probability of an epidemiologic catastrophe, should another respiratory disease agent like that of the 1918-19 influenza pandemic appear in the future."

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METALLURGY

Manganese for Steel Near Shores of Old Seas

➤ NEW FACTS about the ores of manganese, chemical element important in alloy steels, were discovered through years of research and won for Dr. A.

Betekhtin one of this year's Stalin Prizes.

Exploration of manganese deposits during and since the war has been aided by Dr. Betekhtin's finding that sediments of ancient seas are richer nearer their shores in manganese suitable for making ferro-manganese, which is an essential in steel making. As the old sea basins increase in depth, the manganese deposits lessen in oxygen content and have more of other elements, such as phosphorus, which makes them less desirable for metallurgical use.

An exhaustive study by Dr. Betekhtin on "Manganese Ores of the U.S.S.R." has been published. His fundamental researches were done upon the noted Chiatury manganese deposits of the Georgian Soviet Republic.

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RADAR

Chemical Smoke To Stop Radar Waves Predicted

➤ CHEMICAL SMOKE that can stop radio waves as present-day smokes stop light, thus sharply limiting the usefulness of radar, is the prediction of Col. M. E. Barker, commandant in the U. S. Chemical Corps School. Writing in *Chemical Corps Journal* (July) he points out how radar had made concealing smokes largely useless by the end of the war, being used to direct artillery fire at invisible targets.

The comeback of smoke, to stop radar, he pictures as a smoke "that will bounce a radar beam like a duck's back turning a thin stream of water. That means that smoke is going to be mighty effective even against guided missiles, as well as against gun-laying and bombing radars. You can't go to sleep in this scientific race or you will find your long-range missiles being returned to base instead of proceeding to the expected target."

Col. Barker also foresees the return of poison gas, which was absent from World War II. But there'll be changes made—radioactive ones: "Certainly all will have to be prepared against it, and that is going to be some job when arsenic, phosphorus and sulfur can be made highly radioactive and so impart this property to war gases in addition to the usual toxic qualities. . . . Radioactive toxic gas may be even more effective against strategic targets than atomic bombs."

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IN SCIENCE

ENGINEERING

Liquefying Natural Gas For Small-Space Storage

➤ A CHEAP method of converting natural gas into liquid form for storage in small-space tanks was revealed by Northwestern University. Under the new method 800 cubic feet of gas can be stored in one cubic foot of space.

The development is the result of studies by Prof. L. F. Stutzman and Instructor George H. Brown of the University's Technological Institute. Basically the process reduces the temperature of natural gas to 260 degrees below zero Fahrenheit by bringing it into contact with liquid nitrogen at a temperature of minus 320 degrees.

Through the use of refrigeration equipment and insulated storage tanks, they show that large storage tanks of the sort now used for holding natural gas can be eliminated, or used perhaps to hold for immediate use gas obtained from the liquid form. The liquid gas is returned to vapor form merely by reducing refrigeration. The method of liquefying can be used in oil fields to save gas now allowed to escape because of present costs of recapture and shipping.

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BACTERIOLOGY

Viruses Protect Plants From Bacteria in Soil

➤ BACTERIA that cause plant diseases are seldom found in the soil, though fungi and other troublemakers often lurk there. Dr. R. C. Thomas, of the Ohio Agricultural Experiment Station, believes he has found out why.

Bacteria are plants, though very small ones, and like all other plants are subject to virus diseases. Viruses that prey on plant-disease-causing bacteria, Dr. Thomas states, are formed in soil when organic matter is present. The bacteria are not necessarily killed, but they at least lose their virulence. Soils poor in organic matter harbor lower concentrations of these particular viruses, hence the bacteria are more likely to survive in them.

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THE FIELDS

BIOCHEMISTRY

Growth Hormone Speeds Penicillin Production

► **PENICILLIN** production from a given batch of mold has been more than doubled through the addition of a few hundredths of one per cent of phenylacetic acid, by Drs. R. D. Coghill and A. J. Moyer of the U. S. Department of Agriculture, working at the Northern Regional Research Laboratory at Peoria, Ill. The same effects are obtainable also with salts and esters of the acid, they state in the preamble to patent 2,423,873.

At the same laboratory, Dr. S. A. Morell has developed a method for converting furfural, the now well-known "make-all" compound derived from oat hulls and corncobs, into tertiary amino pentanols and their esters. These are useful as intermediates in the preparation of certain drugs. His method has received patent 2,424,184.

Rights in both patents are assigned royalty-free to the government.

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MEDICINE

Fast Work of Cold Germs Halts Antibodies' Action

► **THE REASON** people go on catching colds and having attacks of influenza all their lives seems to be a matter of time. How this time factor comes into the picture was explained by Dr. Colin MacLeod, of New York University College of Medicine, at a recent conference at the Army Medical Center in Washington, D. C.

Influenza and the common cold are caused by germs of the virus class. But curiously, certain virus diseases never attack the same person more than once. Chicken pox, measles, mumps and smallpox are examples Dr. MacLeod gave.

The outstanding difference between these diseases, he pointed out, is in the incubation period. That is the period between the invasion of the body by the germs or virus and the development of the sickness. The virus diseases against which permanent immunity is obtained, the kind, that is, which at-

tack only once, have incubation periods ranging from seven to 26 days.

Resistance or immunity to disease depends on something called antigens. They may come from a disease germ or virus that invades the body on its own, or from the "shot" the doctor gives to protect against certain diseases. The antigen brings about production of antibodies to the disease by the body itself. Certain cells of the body apparently are detailed for this work. An antigen rouses them to action but this requires from seven to 10 days.

From then on, however, these antibody-producing cells remain on the alert. Their response to a second and very much smaller dose of the antigen will be much greater and much quicker—generally in from three to six days. That is fast enough to stop measles or mumps. But in the case of colds, grippe, 'flu and the like, with their very short incubation periods, even the much faster reaction is not fast enough. The malady can become established before the antibodies can get under way.

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CIVIL ENGINEERING

National Water Policy Urged for Better Program

► **A NATIONAL** policy for water conservation and use was advocated at the meeting in Duluth, Minn., of the American Society of Civil Engineers by W. W. Horner, consulting engineer of St. Louis.

"Water is as much a national resource as the country's minerals and just as valuable to the national economy and safety," he said. "It is unthinkable that we can continue indefinitely to suffer life and property losses, just because our irrigation, flood control, navigation, power and other programs are a hodgepodge."

The national policy would replace present "piecemeal development of water programs," and eliminate jurisdictional conflicts and confusion. The policy would be worked out by a committee of expert civil, mechanical, electrical, mining and chemical engineers. It would define positions of all subdivisions of government in a cooperative effort between states and federal government; with the public protected and assured of economic planning and construction of water projects by unbiased review by engineers who have no continuing interest in such developments.

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CYTOLOGY

Nerve Experiments Show Cells Grow Near Center

► **CELLS DO** all their growing in the immediate neighborhood of their nuclei, or centers of physiological activity. The new-grown living substance then migrates to the outside of the cell.

Evidence in support of this concept was presented before the Sixth International Congress of Cytology in Stockholm by Prof. Paul Weiss of the University of Chicago. It was obtained in a study of growth in nerve cells, which are peculiarly well suited for the purpose because nerve fibers, no matter how long, are integral parts of the cells from which they extend. Prof. Weiss and his co-workers found that nerve fibers renewed their worn-out substance and increased in length entirely by the migration of new living material from the cell nuclei.

Another phenomenon on which Prof. Weiss reported is induction, the specific influence by which one tissue imposes a definite character on a neighboring tissue. Past experiments in induction have been carried out with living tissue, but in Prof. Weiss' laboratory it has been demonstrated that the same effect can be obtained with tissues killed by freezing and drying. Frozen-dried cartilage induced growth of new cartilage at spots where it was grafted on.

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MYCOLOGY

Course of Wood Decay By Molds Is Traced

► **WHEN MOLDS** cause the decay of wood, there is a definite series of chemical steps, stated Prof. F. F. Nord of Fordham University before the Sixth International Congress of Cytology in Stockholm. These steps are: cellulose to glucose to ethyl alcohol to acetic acid to oxalic acid. What happens to the other main constituent of wood, lignin, is not so clear.

For a time it was thought that one complex compound, methyl-p-methoxycinnamate, resulted from the breakdown of lignin because it resembles other compounds that can be derived from that substance. Prof. Nord's studies, however, show that one organism can act on wood sugars, glycerol and ethyl alcohol, to produce it. This compound also, therefore, comes from the cellulose fraction of wood.

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ASTRONOMY

Great Square Guide in Skies

Regular grouping will be in the east in the constellation of Pegasus, the winged horse. Meteor shower will occur Aug. 12.

By JAMES STOKLEY

➤ TO THE EAST on August evenings appears one of the most conspicuous of those regular groupings of stars that serves as a useful guidepost in finding one's way about the heavens. This is the "great square," most of which is in the constellation of Pegasus, the winged horse. Its position is indicated on the accompanying maps, in which is shown the appearance of the heavens at 11.00 p. m., daylight saving time, around the first of August, and an hour earlier in the middle of the month. The square is now resting on one corner and the star at the left, named Alpheratz, is in the neighboring constellation of Andromeda, the chained princess. Next to her, farther left, is the figure of her mother, Cassiopeia, shaped like a letter W on one side. Cepheus, her father according to the old myth, is just above.

Near Little Dipper

This constellation is close to the little dipper, directly north, and part of Ursa Minor, the lesser bear. Polaris, the pole star, is at the end of the handle of the little dipper and is indicated by the well-known "pointers," the two stars in the bowl of the big dipper, seen in the northwest. This, in turn, is part of Ursa Major, the great bear. Winding around between the big and little dippers is the sinuous line of stars marking Draco, the dragon.

Directly above the square of Pegasus, we find Cygnus, the swan, sometimes called the northern cross. First magnitude Deneb is at the top of the cross, toward the north. Below the southernmost star, at the bottom of the cross, we see Altair, in Aquila, the eagle. And above—directly overhead, as shown on the maps—is Vega, in Lyra, the lyre, which is the brightest star now visible at night.

Still more brilliant, however, is the planet Jupiter, which is low in the southwest in the constellation of Libra, the scales. Next to this group, toward the left, one finds Scorpius, the scorpion, of which the ruddy first magnitude star

Antares is part. Directly above this figure appears the large constellation of Ophiuchus, the serpent bearer, and the two parts of Serpens, the serpent he is carrying, one to the right, which is the head end, and the terminal end toward the left. Continuing upwards from Ophiuchus we reach Hercules, the strong man of mythology. He is represented, rather inappropriately, by a group of six stars in the shape of a butterfly! The butterfly is facing the west, with one wing to the north and the other to the south. In the western edge of the northern wing, represented by a small cross on the map, one can see a faint spot of light on a dark night, which is really a great globular cluster of stars.

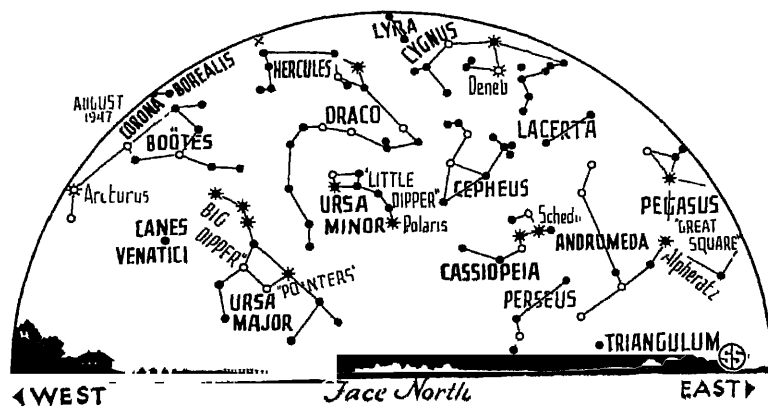
In addition to Jupiter, two other planets can be seen at other times on August nights. About four hours before sunrise Mars appears in the east, in the constellation of Gemini, the twins. Still later, in the early part of the month, the rarely-seen planet Mercury may be glimpsed. On Aug. 3 it is farthest west of the sun and one may see it low in the east, just under the stars Castor and Pollux, of Gemini, the twins. Saturn and Venus, the other two planets that are bright enough to be seen without a telescope, are both too near the sun at present to be viewed.

On any clear night one occasionally sees a flashing point of light commonly termed a "shooting star." Actually, these are not stars at all, but meteors—small bits of cosmic dust that enter the earth's

atmosphere and then are quickly burned by the friction they encounter. Many millions of these come into the atmosphere daily, but the vast majority are vaporized and never reach the ground. Occasionally one is large enough to survive until it lands and then it is called a meteorite. According to a Canadian authority on meteors, Dr. Peter M. Millman, of the University of Toronto, on the basis of an overall average for the year a single observer would be able to see ten meteors an hour on a clear night with an unobstructed view of the sky. These conditions are not often realized for most of us, so that generally not more than one or two an hour can be observed. However, at certain times of year there are meteor "showers," and one of these occurs during August, with the maximum on Aug. 12. Then one might be able to see a meteor every couple of minutes, especially after midnight, for then they are most numerous. In the early morning hours, the earth meets them head-on, while those we see in the evening have to catch up to us.

Meteors from Perseus

The meteors that appear in August, called the Perseids, seem mostly to come from the direction of the constellation of Perseus, the champion, which appears on the map low in the northeast, but rises higher later in the night. Actually they are moving around the sun in parallel paths and on account of perspective these seem to converge in the direction of Perseus, from which they are coming. The swarm goes completely around the sun and follows the orbit of a faint comet seen in 1862, so they are apparently some cometary debris. The



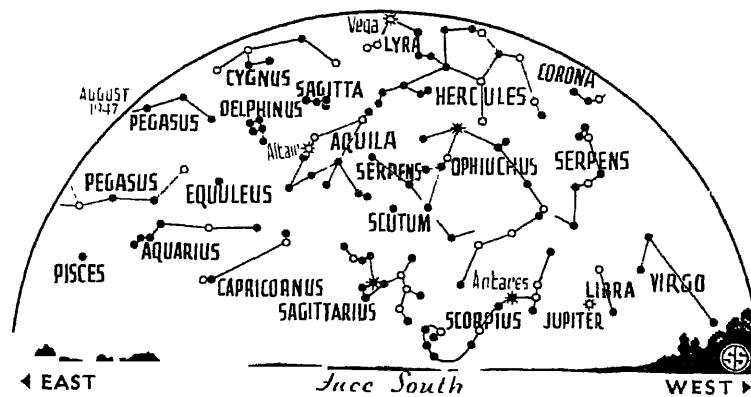
earth's orbit intersects that of the meteors at the place we occupy in August, and that is why the meteors are seen at this time. Of course, the sky must be dark to observe them best. Since the moon is at last quarter this month on Aug. 9, it will rise late on the 12th during the early morning hours, and will hardly be bright enough to interfere seriously, though its light will cut out some of the fainter meteors.

Astronomers appreciate the help of amateurs in observing meteors. A simple but useful task is to count the total number that you see during half hourly intervals, as from midnight to 12:30, 12:30 to 1:00, etc. Such counts may be sent to Dr. Charles P. Olivier, at the Flower Observatory, Upper Darby, Pa., or in Canada to Dr. Millman, at the Dominion Observatory, Ottawa.

As noted in the first part of this article, it is possible to see a faint patch of light in the constellation of Hercules (indicated by a cross on the map), which is a great globular cluster of stars, at least 100,000 in number. This object is at a distance so great that its light (at the speed of 186,000 miles per second) takes 35,000 years to reach us. At such a distance our sun would be invisible with even the most powerful telescope.

About a hundred of these globular clusters are known, and the work of Dr. Harlow Shapley, of the Harvard College Observatory, has shown that they form the skeleton of the huge system of stars called the galaxy of which the sun is a member. Most of the stars are in a flat, grindstone shaped disk. However, the hundred globular clusters form a system that is spherical in form, but sharing the same center as the main galaxy itself.

Centuries ago men thought that the earth was in the center of the universe, but then it was shown that the earth is but one of the planets revolving around



• * • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

the sun. Later, as the idea of the galactic system was formed, it was thought that the sun, and our solar system with it, was near the center of the grindstone, but the work on the globular clusters demonstrated that this was wrong. It was observed that most of these clusters are in one half of the sky, but if we were at the center they would be more uniformly distributed in all directions. Actually, we are tens of thousands of light years away from the center of the galaxy, which lies toward the constellation of Sagittarius, the archer, now visible in the southern sky.

Celestial Time Table for August

August EST		
1	8 50 p. m.	Full moon
3	3:00 p. m.	Mercury farthest west of sun
5	1:00 p. m.	Saturn and sun in line
9	3:22 p. m.	Moon in last quarter
12	early morning	Perseid meteors
	4:47 p.m.	Moon passes Mars
15	3 00 a. m.	Moon nearest, distance 223,300 miles
	5 09 a. m.	Moon passes Mercury
16	6:12 a. m.	New moon
22	12 47 p. m.	Moon passes Jupiter
23	7 40 a. m.	Moon in first quarter
27	11 00 a. m.	Moon farthest, distance 251,900 miles
31	11 34 a. m.	Full moon

Subtract one hour for CST, two hours for MST, and three for PST.

Add one hour for the corresponding Daylight Saving Time.

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separating Bulgaria and Yugoslavia from the Aegean. The end of the handle is against Turkey-in-Europe. Albania is at the butt of the blade, and the blade itself projects into the Mediterranean between the Adriatic and the Aegean. A broken-off point of the blade is the Greek island of Crete that limits entrance to the Aegean to relatively narrow shipping lanes on its west and east.

Another factor in Greece's position is that it is the only non-satellite nation in Europe east of the Soviet line of control which now extends from the Russian-occupied area of Germany on the Baltic sea south to the Adriatic. Control of Greece would give the Soviet Union control of shipping ports to the Mediterranean, and make it easier for it to gain control of the waterway from the Black sea through the Bosphorus, Sea of Marmara, and the Dardanelles.

Albania, Yugoslavia and Bulgaria, all to the north of Greece, have reasons of their own for wanting to control all or parts of Greece. Bulgaria and Yugoslavia want to extend to the Aegean. Albania wants to extend its border. Yugoslavia has ports on its west coast but for many reasons wants ports to the east. Bulgaria's only present ports are on the Black Sea.

Another factor in the situation is the desire of the Macedonians to be an independent nation again. The territorial claims of these people of very ancient stock is the part of Greece on the north shores of the Aegean, and parts of what are now Bulgaria and Yugoslavia. A committee of Macedonians, made up of citizens of the United States and Canada, are urging an "autonomous Macedonia."

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GEOGRAPHY

Importance of Greece

➤ TROUBLED GREECE, now bolstered by American dollars and threatened by alleged Red sympathizers on the north, is a tiny nation as nations go but it happens to occupy a strategically important spot far out of proportion to its size.

In area it is smaller than Alabama, and in population a million or so less than New York City. But it and its

thousands of islands are so situated that Greece is in a position to dominate the eastern Mediterranean, the Adriatic with its ports that serve much of Central Europe, and the Aegean sea which in turn controls the shipping lanes to the Dardanelles and the Black sea.

In shape, it is somewhat like a broad-bladed sickle with its narrow handle

Do You Know?

Moistened baking soda will remove tea and coffee *stains* on china cups.

The export of American *medicinals* is a rapidly growing trade.

Raw oatmeal added to drinking *water* gives a distinctive taste and is said to prevent cramps.

A hundred million *visitors* have entered the New York zoo since its opening 48 years ago.

A new *pipe-smoking* champion kept a single bowlful of tobacco alive for nearly 88 minutes by taking "frugal whiffs."

Belgium's *sand dunes*, which stretch along the coast from the Netherlands to France, cover an area about 15 square miles in extent.

The search for a substitute for *rubber* was begun by the English physicist, Michael Faraday, as early as 1826, it is said.

Ammonia gas is applied to soil as a nitrogen *fertilizer* from tractor-mounted tanks through nozzles five inches below the surface that follow cultivator plows.

Approximately 4% of *Belgium* is land reclaimed from the sea; about 40% of its total area has an elevation less than 300 feet above sea level.

American steel *scrap* salvaged in Europe is sold only for return to the United States; there is a shortage of scrap in the domestic steel industry.

Federal financial aid to the states for *road construction* is now 30 years old, but advisory aid has been available since 1893, when the old Office of Road Inquiry was established.

Entertainers mystify audiences by talking with helium-filled lungs; this *gas* has a density one-seventh that of air and it raises the resonance frequencies of the mouth to change the voice to a comedy *falsestto*.

CIVIL ENGINEERING

Buyers Delay Construction

Resistance to prices is holding up the building of plants and facilities important to production and manufacturing. Different viewpoints presented.

➤ **READY-TO-GO** construction projects, totaling some \$10,000,000,000, are being delayed by buyers' resistance to other commodity and service prices, the American Society of Civil Engineers was told in Duluth, Minn., by Forrest W. Parrott, Sioux City, Iowa, who is president of the Associated General Contractors of America.

The construction projects referred to include the enlargement of present factories and the building of new industrial plants, also many other types of facilities that play a part in America's production, transportation and manufacturing programs.

In addition to the \$10,000,000,000 worth of construction now in blue-print form, another \$40,000,000,000 worth is in other stages of planning, he said. Construction costs may decline gradually to what can be considered new normal levels, but "they cannot return to levels prevailing before the war unless the nation suffers an economic catastrophe."

The public should not be led to believe that there will be quick and drastic reductions in construction costs, he declared. The present "increase above prewar costs is about the same as the general average for most other services and commodities."

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Cost Reduction Essential

A somewhat different viewpoint was presented to the engineers by A. O. Babb of the U. S. Reclamation Service. Construction costs, he said, must be reduced to meet conditions under which "contractors allegedly are pricing themselves out of a juicy market, and owners and government engineers face costs that exceed the economic return of projects, or the unwillingness of the taxpayer to pay."

"If the construction industry, as a group, is to have any effect on our economy . . . it must, through cost analysis and control, keep the slope of the construction cost index just a little better than the others. Contractors today are not competing with each other

for jobs nearly as much as they are competing for dollars with other industries."

Science News Letter, July 26, 1947

Research May Lower Costs

A building industry research program, seeking technological methods to increase efficiency and lower costs, was detailed by J. C. Stevens of Portland, Oreg. "Improved methods and materials offer an effective answer to the charge . . . that the construction industry is pricing itself out of the market."

Steps have been taken to organize a national building research advisory board, under the National Academy of Sciences. Dr. Frank B. Jewett, ex-president of the Academy, has agreed to serve as its chairman. The board would collect available information relating to building construction, evaluate it without bias, and circulate it to builders and others interested.

Science News Letter, July 26, 1947

CHEMISTRY

Process Makes Plastic From Bituminous Coal

➤ A GROUP of British inventors under the leadership of Donald Hugh Bangham of London have developed a process for making molded plastic articles simply by applying high pressure to powdered bituminous coal, at moderate temperatures.

The preferred temperature is about 345 degrees Centigrade, which is intermediate between the lower "tarry-softening" and the higher coking temperatures. Preferred molding pressures range between 4,500 and 6,700 pounds per square inch. Various fillers may be included if desired.

The product is glossy black, glassy in texture, does not make black streaks when rubbed on paper. It can be used for electric insulators, containers for corrosive chemicals, etc.

Rights in the patent, No. 2,424,012, are assigned to C. D. Patents, Ltd., of London.

Science News Letter, July 26, 1947



State Science Fairs and Searches

A Report to Science News Letter Readers



➤ THE THIRD of a million boys and girls who belong to the more than 14,000 clubs affiliated with Science Clubs of America are discovering that scientists and educators are seriously interested in helping them to become scientists.

Generosity of scientists toward promising young scientists is no new phenomenon, but this essential meeting of the experienced and inexperienced has never been so widespread and well planned before.

The feeling of responsibility on the part of adult scientists to encourage the boys or girls who shortly may be their assistants or co-workers has been gaining momentum steadily in the last decade.

This year, relieved of pressing wartime duties and responsibilities, scientists and educators have turned attention to the business and pleasure of giving promising youth the incentive that can come only from mutual understanding between individuals who "speak the same language."

In the 37 states now cooperating with Science Clubs of America, a Science Service activity, in this catalytic process of helping students to help themselves, the methods used are as interesting and varied as the individuals concerned.

Two highly successful methods have emerged the Science Fair and the State Science Talent Search.

Science Fairs

➤ THOUSANDS of young scientists have brought the results of this year's work to science fairs. Well-known scientists have judged their efforts and awarded prizes to the best of them. Fairs provided powerful incentives for individuals to complete their experiments and present them publicly. They brought beginning and mature scientists together. They gave the public a chance to see new developments in science, graphically and skillfully explained by boys and girls. Most important of all, fairs gave each young scientist the inspiration and enthusiasm that is bound to result from meeting others of his own age working on similar problems.

Here are a few illustrations of successful science fairs

Pittsburgh

The Buhl Planetarium was the scene again of the Pittsburgh School Science Fair held April 19 through May 3. Now in its eighth year this Fair has constantly improved its quality until now any exhibitor can take pride in being admitted to show his work there. Sponsored by the Planetarium and the PITTSBURGH PRESS, the Fair attracts students and visitors—more than 7,000 in the first week—from all western Pennsylvania and provides the climax of a year-round program of stimulation of science by educational, scientific, industrial and youth organizations in that area. Awards range from medals and cash to college scholarships and job recommendations.

New York City

The American Institute of the City of New York held its 14th School Science Fair Dec 7-11 at Madison Square Garden after a wartime lapse of several years. The Fair attracted entrants from all schools in the metropolitan area. School classes roamed its exhibit-packed aisles during the day. The public by thousands studied it during the evening hours. Cash awards bolstered the budget of many a boy and girl and made possible bits of laboratory equipment and material needed to make a better exhibit for next year.

Providence, R. I.

The Second Annual Rhode Island Schools' Science Fair was the high spot of the season for young scientists in that area. Educational and scientific agencies of all kinds in the state cooperate with the PROVIDENCE JOURNAL in making this affair a thrill to the public as well as an event of real educational value to the exhibitors. From April 8 through 11 a total of 15,000 jammed Hope High School in Providence to see 576 exhibits from all parts of the state. Public, private and parochial schools recognize the event as one of important educational stimulation. Judges from the state and other states and scientists of note invited for the evening programs make this a week of great importance to the students and the public.

Washington, D. C.

The first annual Washington Science Fair was held in the Nation's Capital May 19-23 under the auspices of a committee of educators and scientists. More than 400 exhibitors of all ages showed their work at the Department of Commerce auditorium. Judges were scientists of national and international renown, who reported after several hours of button pushing and wheel turning that they had not had so much fun in years. The public enjoyed the same sport during the daytime and evening hours.

Buffalo, N. Y.

The Buffalo Museum of Science held its Fifth Annual Science Congress and Fourth Annual Buffalo Salon of Photography this year. Over 600 young scientists came from all parts of western New York. Youthful speakers and photographers were awarded cash, books, medals, trophies and trips to points of scientific interest. Planning and awards came from scientific, civic, industrial and educational organizations in that area.

➤ MORE information about cooperation with Science Clubs of America may be obtained by writing to Science Clubs of America, 1719 N St. N.W., Washington 6, D. C.

Talent Searches

➤ ABOUT 16,000 high school seniors this year entered the Sixth Annual Science Talent Search for the Westinghouse Science Scholarships, sponsored by Science Clubs of America, administered by Science Service and made financially possible by the Westinghouse Educational Foundation. From this number 40 were named as winners and 260 received honorable mention. In addition, a large number of other very fine students were cared for by several states that considered them for state awards. Some of the State Science Talent Searches already reported are

Georgia

A committee of judges appointed by the Georgia Junior Academy of Science chose five from 23 entrants in the national competition to receive state honors and awarded each \$50. All of the boys were recommended to Georgia colleges and universities for scholarship consideration.

Illinois

While four students from this state were winners in the national competition and 13 others were named for honorable mention, the Illinois State Academy of Science considered others worthy of honors and named a total of 31 for state honors. Nine different colleges and universities in that state gave them outright scholarships or other financial assistance that will enable them to continue their science education.

Iowa

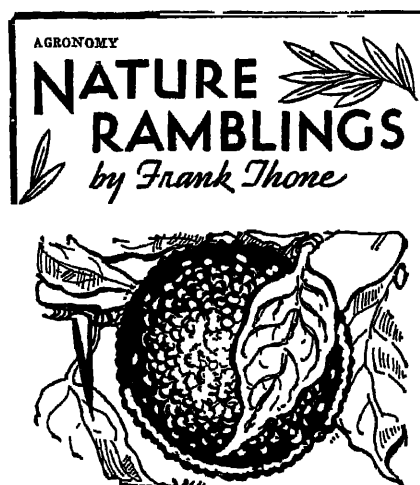
The Iowa Junior Academy of Science honored nine students out of the 56 that entered the national competition. These nine were offered full tuition freshman scholarships at Iowa State College. These scholarships were created for the first time to make it possible for these promising students to go on with their studies.

Louisiana

A committee of the Louisiana Academy of Science selected three boys for state honors. Two of them had also won honorable mention in the national competition. All were recommended to colleges and universities in the state for scholarship assistance.

Virginia

The Virginia Academy of Science, conducting their Science Talent Search for the second time, narrowed their 120 contestants down to 42 by requiring each of them to show their work at one Open House at any of six colleges and universities in the state. From the 42 the committee selected 15 for state honors. Each received a \$50 savings bond and assistance in gaining entrance to the school of his choice within the state. Five of the 15 had won honorable mention in the national competition. All were entertained by the Academy at its two-day state meeting.



Technological Unemployment

➤ THE INVENTION of the cotton gin made cotton the South's principal crop. The steel plow and the reaper hastened the shift of the grain belt from the hills of the East to the prairies of the West. The linotype and the rotary press, by greatly cheapening printed matter and thus increasing its use, have created a crisis in forestry, with easily accessible native stands of timber being wiped out faster than new pulpwood is being grown.

In a little less obvious way, the invention of barbed wire has caused the near-disappearance of the Osage orange, a once familiar high shrub or small tree.

When the prairie lands of the Midwest were being opened up, a century or so ago, the most easily available way of dividing field from field, and keeping stray cattle on the road from getting into the corn, was to plant a hedge. Neither the rail fences made of split logs from cleared land farther east, nor the stone walls of the Atlantic seaboard, were

practicable on the prairies, where there were few trees and even fewer stones.

Most practical hedge plant was the Osage orange. It is a native plant, with its center of distribution in the Ozarks and nearby regions, so it was readily available and already acclimated. It grows rapidly and branches freely if cut back, so can be induced to form a thick, stout hedge in a short time. And it is armed with most formidable thorns, discouraging to would-be animal trespassers.

Early nurserymen grew great stocks of it, and sold young plants by the millions. From the sixties to the nineties of the last century there were literally thousands of miles of Osage hedge. If you went for a buggy-ride in the country, you were almost continuously "hedged in" by the thick shrubs,

trimmed waist-high, on both sides of the road.

Then somebody conceived the idea of putting steel thorns on twisted wire, and invented a machine for making the stuff. A barbed-wire fence took less space than a hedge, which of course claimed several yards of soil on either side of itself for its own nutrition. This materially increased the tillable area of each field.

So the hedges began to decline. Farmers dug them out, or hired professional crews with steam-powered machinery to root them up with giant plows. The smoke of their burning drifted over all the land.

Here and there, stretches of hedge still survive, usually neglected and allowed to grow to full height of 20 or 30 feet. But they are only fragments of what was once the empire of the Osage orange.

Science News Letter, July 26, 1947

GEOGRAPHY

Falklands' Good Location

➤ THE BRITISH have in the Falkland islands a stake to bargain with Argentina for food and markets. From the ordinary economic viewpoint, these forestless, sheep-raising small islands have little value. On the other hand, however, they have strategic value to both nations.

The Falkland islands, with a total area about the size of New Jersey, are some 250 miles east of southern Argentina. With natural harbors, capable of development, the group could become a marine center to protect the Argentina coast and to control traffic from the Atlantic to the Pacific by way of the Straits of Magellan, or on the open route around Cape Horn.

To Britain, the Falklands have proven naval value. It was from their hidden harbors that a British fleet, which was re-coaling, rushed out to meet and defeat a German fleet in December, 1914. This event marked the end of a definite phase of World War I at sea.

In these days of increasing interest in the South Polar region, the islands have another value. They are on the route from England to the South Pole by way of the British-owned South Shetlands and South Orkneys. The latter group is a final take-off station to explore the Antarctic. The Falklands are a way station.

The Falklands, over the ownership of which England and Argentina are now in dispute, are as far south of the

equator as the British Isles are north. Together with the Shetlands and other islands in that neighborhood, they are Britain's most southerly possessions. The United Kingdom's claim is based on discovery (in 1592), settlement, ownership for many years, and because of its Scottish population. Argentina's claim is based largely on proximity and need.

There are over 100 islands in the group but only two, East Falkland and West Falkland, are large enough to have value. These contain about 3,000 and 2,300 square miles of area, respectively. Their total population is in the neighborhood of 3,000 persons. The principal town is Stanley, on the landlocked harbor within Port Williams, on the east coast of East Falkland.

Science News Letter, July 26, 1947

INVENTION

New Tank Truck Feature

➤ TO OBVIATE dragging filling hoses to the tops of the huge tank trucks now in use, J. H. DeFrees of Warren, Pa., has filling connections in the bottom of the one on which he has been granted patent 2,423,879. Within, an inverted U-shaped pipe carries the gasoline or other liquid up, then down near the bottom again for discharge. Patent rights are assigned to the Pennsylvania Furnace and Iron Company.

Science News Letter, July 26, 1947

YOUR

HAIR

AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as:

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Books of the Week

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ANCIENT PLANTS AND THE WORLD THEY LIVED IN—Henry N. Andrews—*Comstock*, 279 p., illus., \$4.50. An introduction to paleobotany to help the present day botanist understand the flora of the world we live in by explaining the derivation of present plant forms from past ones.

APPLIED ARCHITECTURAL ACOUSTICS—Michael Rettinger—*Chemical Pub.*, 183 p., illus., \$5.50. A discussion of the progress made in this type of functional design in the past decades, particularly due to the demands of sound studios and theaters. A practical handbook for architect and engineer, it will also serve the student well.

AS YOU SOW—Walter Goldschmidt—*Harcourt*, 288 p., illus., \$4. A study of the effects of industrialized agriculture on the traditional rural society and its daily life.

ATOMICS FOR THE MILLIONS—Maxwell Leigh Eidinoff and Hyman Ruchlis—*McGraw-Hill*, 278 p., illus., \$3.50. With simple, understandable illustrations, this explanation of atomic energy can be followed by the reader who has no previous scientific or mathematical training. It also explains what the hopes are for future uses of atomic energy in industry and medicine.

CINEPLASTY—Henry H. Kessler—*Thomas*, 201 p., illus., \$6.75. An examination of the subject of fitting the amputee with the best possible prosthesis and utilizing the still functioning muscles for its activation.

CLASSIFICATION AND RANGES OF THE GOPHER SNAKES OF THE GENUS PITUOPHIS IN THE WESTERN UNITED STATES—L. M. Klauber—*Zoological Society of San Diego, Bulletin* 22, 81 p., illus., paper, \$1.15.

CULTURE COMPLEXES AND CHRONOLOGY IN NORTHERN TEXAS WITH EXTENSION OF PUEBLOAN DATING TO THE MISSISSIPPI VALLEY—Alex D. Krieger—*Univ. of Texas*, 366 p., illus., \$2.50. An attempt at correlation across the Southwestern and Southeastern parts of the continent, in terms of culture complexes, chronology of Puebloan architecture, and degrees of contact of peoples in these parts.

ELECTRICAL ENGINEERING Problems and Their Solutions—T. F. Wall—*Chemical Pub.*, 312 p., \$5. A companion volume to **PRINCIPLES OF ELECTRICAL ENGINEERING**, examples have been chosen to emphasize the principles therein dealt with; graded to tax the faculties of the solver.

ENCYCLOPEDIA OF HYDROCARBON COMPOUNDS VOL. II—C6 and C7—Joseph Escott Faraday, compiler—*Chemical Pub.*, 603 p., \$17.50. With sturdy loose-leaf binder so that replacement-addition sheets may be quickly inserted, this research aid presents molecular and structural formulae, occurrence in nature, trivial names, methods of preparation, physical constants, properties, and tests for all compounds. An extensive bibliography is included.

GENERAL PLASTICS. Projects and Procedures—Raymond Cherry—*McKnight and McKnight*, 156 p., illus., paper, \$1.50. A

handicraft book explaining carefully all the procedures used in making articles from plastics. This versatile material lends itself well to working in the home shop.

HANDBOOK OF INDUSTRIAL RADIOLOGY—Members of the Industrial Radiology Group of the Institute of Physics, J. A. Crowther, ed.—*Edu. Arnold & Co.*, 203 p., illus., \$7. Uses of X-ray for flaw detection together with practical information on setting-up the material for exposure and response of photographic materials.

LABOR'S RELATION TO CHURCH AND COMMUNITY—Liston Pope, ed.—*Inst. for Religion and Social Studies*, 182 p., \$2.50. Labor leaders discuss their aims and achievements in relation to the community and the values and faiths by which they live.

MAKING YOUR OWN TELESCOPE—Allyn J. Thompson—*Sky*, 211 p., illus., \$3.50. Complete instructions and detailed diagrams for making your first telescope. The one illustrated, made by the author, cost under \$30.

MOCHE A PERUVIAN COASTAL COMMUNITY—John Gillin—*Smithsonian Inst., Inst. of Social Anthropology Publ.* No. 3, 166 p., illus., paper, \$1. Study of a community in the last stages of losing its identity as an Indian group and being absorbed into national Peruvian life.

MODERN POLISHES AND SPECIALTIES—W. D. John—*Chemical Pub.*, 313 p., \$7.50. Industrial and household polishes are here thoroughly discussed, starting with the basic raw materials which compose the various types.

POSTWAR RESEARCH IN MELLON INSTITUTE—*Mellon Inst.*, 38 p., illus., paper, free. The Thirty-Fourth Annual Report of the Director, this booklet discusses the activities of the Institute during the year 1946, both accomplishments and projected work.

POWDER METALLURGY—Henry H. Hausner—*Chemical Pub.*, 307 p., \$7. The principles of powder metallurgy are explained in the form of tables and graphs. A glossary of terms is included as well as an extensive bibliography. No micrographs to show effects of sintering temperatures and mold pressure, particle size, etc.

PRINCIPLES OF ELECTRICAL ENGINEERING—T. F. Wall—*Chemical Pub.*, 563 p., \$8.50. Basic principles outlined with emphasis on those relating to both heavy-current and light-current engineering practice.

A PROGRAM FOR NATIONAL SECURITY—Report of the President's Advisory Commission on Universal Training—*Govt. Printing*, 448 p., paper, 75 cents. The official plea for universal military training. The dozen pages on "Possible Future Warfare" are frightening because they are sober.

RETINAL STRUCTURE AND COLOUR VISION—E. N. Willmer—*Cambridge Univ.*, 231 p., illus., \$4.50. A statement of the facts and theories of the phenomena of color vision examined under the present knowledge of physiology for the purpose of stimulating both thought and research in this little understood field.

STEEL CASTINGS—Eric N. Simons—*Chemical Pub.*, 206 p., illus., \$5. A simple presentation of pertinent and practical facts relating to the manufacture, properties, and uses of cast steel.

YOUR FARMHOUSE. CUTOUTS TO HELP IN PLANNING—Bureau of Plant Industry, Soils and Agricultural Engineering, Bureau of Human Nutrition and Home Economics, and Extension Service, U.S. Dept. of Agric.—*Govt. Printing*, Misc. Publ. No. 622, 47 p., illus., paper, 25 cents. Cutouts of furniture, accessories, etc. to plan a useful living unit.

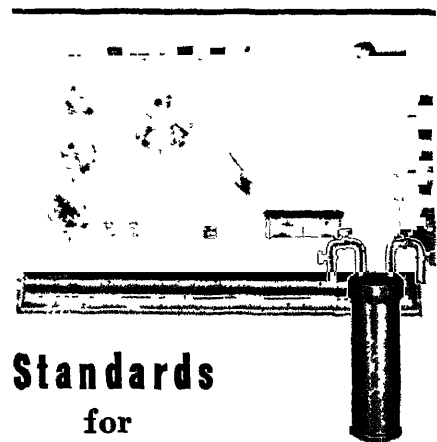
Science News Letter, July 26, 1947

OPTICS

Conducting Light Beam

➤ A FLEXIBLE "light pipe," to conduct a small beam of light to the exact spot desired, won patent 2,424,064 for R. F. E. Stegeman of Greece, N. Y. A series of disks of lucite or similar plastic arranged face to face in a flexible tube, with a projecting endpiece of the same material. The disks conduct light from a lamp at the bottom practically as well as if they were a solid rod, yet the device can be bent freely. Patent rights are assigned to Bausch and Lomb Optical Company.

Science News Letter, July 26, 1947



Standards for Instrument Calibration

The Type K-2 Potentiometer and the NBS Resistor shown above are two among many L&N instruments which are ideal for production calibrating. They offer high accuracy and dependability, and a convenience of use which can help to make even precision testing a matter of routine.

For details, see Catalog E, which describes our complete line of instruments for research, teaching and testing.

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☼ **LIVE BAIT** for fishermen is a wiggling minnow within a tiny elongated pointed cylindrical casing made of a transparent plastic. The fish line is attached to one end and fish hooks to one side and to the other end. The device is effective with bass, pike, pickerel and other game fish.

Science News Letter, July 26, 1947

☼ **SPEED VISE** for the mechanic's bench is operated hydraulically by foot levers. With a few easy strokes of the foot-operated hydraulic pump, the operator can build up pressures from a feather touch to a seven-ton squeeze, and control jaw action from very fast to very slow.

Science News Letter, July 26, 1947

☼ **EXPLOSION-PROOF** electric motors, particularly for airplanes, are housed in enclosures with venting windows covered with a new porous metal. The vented construction permits the products of explosion to escape easily, prevents accumulation of combustible gases, and keeps hot products of compression cool.

Science News Letter, July 26, 1947

☼ **VISION** training instrument resembles the familiar stereoscope but has separate tracks which permit the two pictures to be moved into a variety of positions. The child, as shown in the picture, adjusts the pictures until they



merge into one; the scale readings are interpreted by the doctor.

Science News Letter, July 26, 1947

☼ **ELECTRONIC DEVICE** detects metal particles and other impurities in candy and other foodstuffs as the material being inspected passes before it on an endless conveyor. If contaminated material passes, a lamp is lighted or a bell rung, or the package is automatically deflected into a special channel.

Science News Letter, July 26, 1947

☼ **DENTAL COMPACT** is a plastic case about the size of a package of cigarettes, within which is space for tooth powder and a folding toothbrush. The handle of the brush is hinged so that it folds back over the rear of the bristle end. It is held open in full-length position by a sliding panel on its rear.

Science News Letter, July 26, 1947

☼ **PARKING LAMP** for automobiles draws slightly more than one-tenth of an ampere per hour yet gives a steady light visible at 1,000 feet. The standard storage battery, charged for 100 ampere hours, would sustain the light over 900 hours. The three-ounce lamp, with lens of ruby-glass, is easily installed.

Science News Letter, July 26, 1947



SCIENCE SERVICE BOOK SELECTION EINSTEIN: HIS LIFE AND TIMES

by Philip Frank

The absorbing, human story of a great scientist—his life and travels, his physics, his philosophy—described by one who is himself an eminent philosophical scientist and personal friend of Einstein. Dr. Frank presents an understandable explanation of Einstein's discoveries including the momentous theory of relativity. A section of the book is also devoted to Einstein's basic research in atomic physics, which heralded the atomic age. \$4.50. 298 p.

This book is one of those chosen from time to time by Science Service for the convenience of its readers, as an outstanding work in its field.

Question Box

AERONAUTICS

What advantage has the rotor and blade system of the XR-10 helicopter? p. 54.

AGRONOMY

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ASTRONOMY

What are shooting stars? p. 58.

BACTERIOLOGY

Why are bacteria that cause plant diseases seldom found in the soil? p. 56.

CHEMISTRY

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CYTOLOGY

Where do cells do their growing? p. 57.

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MEDICINE

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How could a world-wide flu epidemic start? p. 56.

How is club foot caused? p. 50.

Why do people keep on catching colds? p. 57.

NUCLEAR PHYSICS

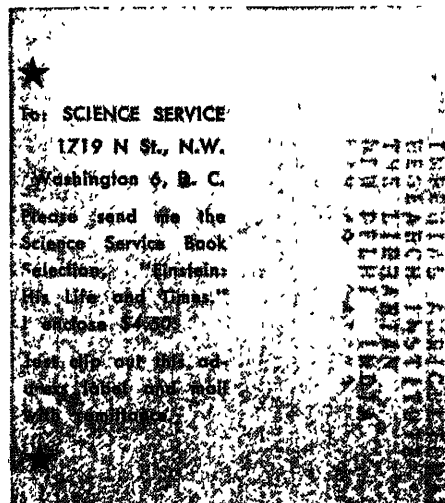
What is the best material for absorbing radiation in which to embed a cyclotron? p. 51.

RADIO

Can walkie-talkies be used in the citizens radio service? p. 51.

Pictures: Cover, p. 51, University of California; U. S. Coast Guard, p. 53; U. S. Army Air Forces, p. 54; Science Service, p. 55.

Where published sources are used they are cited.



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SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION

HORTICULTURE

Sugar Cane Weed Conquered by 2,4-D

➤ CONQUEROR of many a tough weed in this country, 2,4-D has demonstrated its power over even tougher weeds in the tropics. Prof. Kenneth V. Thimann of Harvard, just returned from Cuba, tells of successful experiments with this chemical killer against the most troublesome of cane-field weeds, a woody plant of the legume family known as *Aioma marabu*. This weed has hitherto defied hoeing and mechanical cultivation, which merely chop its tops off but leave the roots alive and ready to throw out new sprouts.

Best success with 2,4-D was scored with the sodium salt of the compound, with one-half per cent of Carbowax 1500 added to help the spray to stick to the leaves. 2,4-D ester in oil was also effective. Both these compounds were used in three-tenths per cent concentration, which is three times the strength commonly used on weeds in this country.

Another troublesome tropical woody weed that can be knocked out with 2,4-D is a botanical cousin of poison ivy, having quite similar effects on the human skin. Botanists call it *Comocladia dentata*, but its common name in Cuba is "guao". "Guao" is pronounced (approximately) "WOW!" and in everyday speech means just about that.

Prof. Thimann, reporting briefly on the work in *Science* (July 25), states that the experiments are being continued.

Science News Letter, August 2, 1947

PSYCHIATRY

Reflex Method Tests For Serious Brain Damage

➤ IF YOU CAN'T be taught to make your mouth water at sight of a juicy beefsteak, there may be something wrong with your brain.

This is the basic method used in a kind of speedy examination that physicians can now use in searching for serious brain damage.

The new 30-minute method was demonstrated at the Fifth International Congress of Pediatrics in New York by Dr. W. Horsley Gantt, of Phipps Psychiatric Clinic, Johns Hopkins Hospital, Baltimore, Md.

Your mouth waters at the taste of a juicy beefsteak. That is known as an in-

born reflex. But even young babies can learn to have the same mouth watering or start sucking movements at just the sight of food. This acquired reflex is known as a conditioned reflex.

The ability to form new conditioned reflexes depends on the action of the higher nervous centers and especially in mammals upon the cortex. The higher in the animal scale, the more does this ability to form conditioned reflexes depend upon the brain cortex.

Inability to form new reflexes points to serious damage to the brain cortex—perhaps a brain tumor. It is also possible through use of the conditioned reflex technique to distinguish between functional disturbances such as neuroses, psychoses and hysteria and the organic disturbances.

Science News Letter, August 2, 1947

GENERAL SCIENCE

Science Foundation Bill About To Become Reality

➤ CONGRESS has voted a National Science Foundation (See SNL, July 26) after nearly two years of planning and debate. President Truman was expected to sign the new foundation into being this week.

Heading the foundation, under terms of the compromise conference report passed by both houses of Congress, will be a 24-man board of part-time policy-makers appointed by the President with the approval of the Senate.

The director of the foundation will be appointed by the board. The directorship, an important new post in American science, will be a full-time job with an annual salary of \$12,000.

Planned as a peace-time successor to the World War II Office of Scientific Research and Development, the foundation will be the agency for administering federal support of science. Since the end of the war, OSRD has been going out of business, and federal support of science has been left chiefly in the hands of the Army and the Navy. The military program in science has included not only the development of weapons but also the support for fundamental research. Most of this latter program will now move over to the new foundation.

Work of the foundation will be divided into special divisions. Social sciences, originally urged by many scientists as one of the divisions, are not included in the bill passed by Congress. In addition to the divisions created within the

foundation, special commissions for attacking cancer, heart diseases and poliomyelitis are authorized, and others may be added.

Basic research will be emphasized in the foundation program, but foundation's jobs will be done through grants, loans, scholarships and other aids to scientists and laboratories, rather than in new laboratories actually directed by the foundation.

Science News Letter, August 2, 1947

MEDICINE

Headache and Spasm Are Early Symptoms of Polio

➤ DOCTORS should diagnose and treat infantile paralysis early in order to reduce discomfort and crippling of the victims, Dr. John F. Pohl of the Elizabeth Kenny Institute, Minneapolis, urges in a report appearing in the *Journal of the American Medical Association* (July 26).

Headache is the most distinctive initial complaint. This is usually a severe, generalized, unrelenting type, which is rare in the illnesses of childhood.

Spasm, which is shortening of the muscles, appears early and is present in every case, Dr. Pohl also found in studying 1,125 cases of poliomyelitis during the 1946 epidemic. Paralysis is not a common early symptom, however.

"Symptoms and observations are sufficiently characteristic to enable the diagnosis to be established in most patients within 24 hours of the onset," Dr. Pohl said. "The study also discloses that paralysis is not a useful diagnostic sign because paralysis or weakness of the muscles is not a common early event and in a considerable number of cases does not occur at all. To await the appearance of paralysis to confirm the diagnosis or to begin treatment is inadvisable. It is now recognized but should be emphasized, that patients without paralysis are often seriously ill and may become crippled from conditions other than paralysis which affect the muscles. All cases should be brought under treatment as soon as possible."

Science News Letter, August 2, 1947

United States imports from Argentina *hides* and *skins* of animals not known here; they include carpincho, a large rodent; jabali, a wild boar; lagarto, a large lizard; vibara and boa, snake; and lobo marino, a seal.

OPTICS

Ultraviolet Searchlights

Planes were not equipped with this light during the war because some can see it. Plan was perfect in theory but impractical.

➤ A WAR-DEVELOPED plan for landing planes on carriers in pitch-black darkness by the use of ultraviolet "invisible" light was never put into actual use because it was discovered that a few eyes can see this so-called invisible light.

The plan, perfect in theory but impractical in war, was revealed by Dr. E. D. Tillyer of the American Optical Company. In the plan, airplanes were to be equipped with searchlights sending out only ultraviolet rays. When returning to their mother-ship these rays would be used in locating the carrier.

The carriers were to be equipped with special reflectors each with a fluorescent button which the ultraviolet rays would cause to glow brilliantly. The diffused fluorescent light from each button would be collected by the complex curves of the mirror and concentrated through a special lens that would send a very narrow beam back to the plane.

This returning visible beam is so narrow that an enemy pilot, flying wing to wing beside the landing plane, could not see the fluorescent light outlining the carrier. Its spread after traveling more than a mile was only a few feet.

Tests made by University of Rochester scientists, who developed the reflectors, revealed that a few persons have eyes that can see the ultraviolet rays used although they are invisible to most eyes. An enemy pilot might happen to have this unusual ability. In that case he could see the beams sent out by the plane and locate the plane. However, he could not see the outline of the carrier unless he were directly within the path of the returning fluorescent beams.

Although the Schmidt-type correcting lens developed for use in the ultraviolet reflector could not, from a war-time standpoint, be used for that purpose, it is used in another instrument still held a secret by the Navy. A similar lens has been developed by American Optical scientists for use in television reception.

Ultraviolet waves are similar to ordinary light waves but are of a different

length. They are beyond one end of the so-called visible spectrum, with its seven primary colors. Invisible infra-red rays are just beyond the other end. These are often called heat waves, and they were used for "seeing" in the dark in the Army's sniperscope. By electronic means they made visible an object otherwise hidden to the eye.

Science News Letter, August 2, 1947

VETERINARY MEDICINE

Cleaning of Cars Combats Foot-and-Mouth Disease

► FOOT-AND-MOUTH disease of cattle is not going to ride the rails, if the Mexico-U. S. combat team can help it. Cattle cars reaching the yards in Mexico City get a three-stage going-over that cleans them thoroughly and destroys any possible lingering virus before they are used again.

First, a cleaning force removes all litter and manure. Then the cars are shifted to another siding, where they are thoroughly hosed down. After drying, they are disinfected inside and out with a spray of caustic soda.

Cars that have been thus treated are sealed and placarded as safe for further

use, then sent out into the cattle country again. Three technicians, one of them Mexican, the others American, personally supervise the cleaning and disinfection of every car.

Science News Letter, August 2, 1947

GENERAL SCIENCE

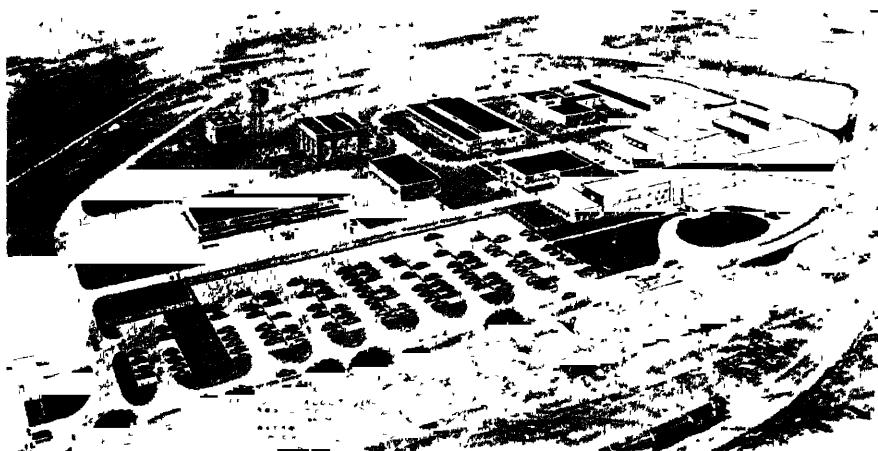
Human Resources Committee Has Psychologist as Head

► DR DONALD G. MARQUIS, chairman of the department of psychology at the University of Michigan and president of the American Psychological Association, has been named chairman of a committee on human resources of the Joint Research and Development Board

Board Chairman Vannevar Bush, president of the Carnegie Institution of Washington, said the new committee will study the human element in both military problems and civilian defense.

Members of the committee in addition to Dr. Marquis are: Dr. C. L. Shartle, executive secretary of the personnel research board, Ohio State University; Dr. Frederick F. Stephan, department of sociology, Cornell University; Dr. Samuel A. Stouffer, department of social relations, Harvard University; Maj. Gen. Fred L. Anderson, Maj. Gen. Raymond W. Bliss and Col. Fred C. Milner, representing the U. S. Army; and Dr. A. H. Hausrath of the Office of Naval Research, Rear Adm J. W. Roper and Capt D. T. Eddy, representing the U. S. Navy.

Science News Letter, August 2, 1947



ATOMIC ENERGY FACILITY—Part of this structure not shown in the architect's sketch is to be underground in order to obtain necessary conditions for certain types of atomic energy research. Constructed of red brick, the building will be completed in Miamisburg, Ohio, early next year.

Transcript of a Meeting of the Board of Directors of the American Telephone and Telegraph Company, Inc., held on December 1, 1931.

ANTHROPOLOGY

Panchito Visits New York

► PANCHITO HAS MADE his first trip to New York in the company of Dr. T. D. Stewart of the U. S. National Museum in Washington. Panchito grinned, but he wouldn't say anything about the skyline. For Panchito has been dead some 15,000 years; he is the most famous of early American skeletons.

"Panchito" is the nickname which Mexicans have bestowed upon Tepexpan man, who is quite a popular personage among his present-day compatriots. Quite properly so, for he has a number of unique distinctions: He is certainly the earliest known Mexican, possibly the earliest known North American. He is the only American thus far found who died in the company of a herd of native American elephants. Finally, he is the only prehistoric man anywhere whose remains were discovered through the use of the same geophysical methods that are used in prospecting for oil and minerals.

Since the arrival in this country of this highly important skeleton, some of Panchito's secrets have been won from him by Dr. Stewart and Senor Javier Romero, Mexican scientist who carried the bones on their long plane flight from Mexico City to Washington.

Senor Romero has been reconstructing the long bones of his arms and legs, which were more or less cracked up when found. There are formulae which enable anthropologists to estimate a dead man's probable height in life from measurement of these bones. Panchito presents a riddle, for his forearm bones indicate that his height was about five feet eight inches, whereas his leg-bones indicate a height of only five feet five or six inches. Seemingly Panchito was a short man with long arms—good lightweight fighter, maybe.

Dr. Stewart has made a plaster-of-Paris cast of the interior of the skull, on which studies of brain size and shape will be made. Thus far it is possible to state only that this early American had a good brain, with sharply-marked convolutions.

While in New York, Panchito is making his headquarters with the Viking Foundation, which sponsored the search over an ancient lake bed near the town of Tepexpan that brought the now famous bones to light. The search was led by Dr. Hellmut De Terra, Viking Foundation anthropologist, Dr. A. V. R. Arel-

lano of the Geological Institute of Mexico, and Dr. Hans Lundberg, Canadian geophysicist.

Science News Letter, August 2, 1947

MEDICINE

Cancer Weapon Hunt Goes to Deep Sea

► SCIENTISTS are turning to the deep sea for possible weapons in the war on cancer.

Two researchers in the University of California's Scripps Institution of Oceanography have found that marine microorganisms cause some destruction of hydrocarbons which have been found to produce cancer tumors in mice.

Benzanthracene, dibenzanthracene and other cancer-producing hydrocarbons were attacked and oxidized considerably by the action of a culture of deep-sea bacteria under controlled laboratory conditions.

"The findings from these cursory investigations have been presented with the hope of stimulating further research into the possible application of bacteria or their products to the treatment," explains Dr. Claude E. ZoBell, associate professor of marine microbiology, who led the investigation.

Collaborating with Dr. ZoBell was Frank D. Sisler, research assistant.

Science News Letter, August 2, 1947

EDUCATION

Military Equipment Pays Cost of Foreign Study

► MILITARY EQUIPMENT left on a hundred beachheads will soon be paying the cost of study and research by Americans in some 22 countries.

Surplus U. S. material sold abroad will be used under the Fulbright law passed last year to finance educational grants for U. S. citizens in cooperating countries. The State Department is ready to receive applications from those who want to study abroad, although actual inauguration of the program may be some months in the future, due to conditions abroad. Already 12,000 have applied, 5,000 of whom are veterans.

In Italy, the United Kingdom and China there will be a million dollars available annually for the next 20 years. Nineteen other countries will have lesser

amounts for educational exchanges.

The Fulbright law money can not be spent within the United States, but nations can arrange to defray the travel of their students to and from the borders of the United States if that travel expense can be paid in their own currency.

Most fruitful use of the money is expected to be for graduate study and investigations. Experience has shown that foreign study is most profitable to the student after regular college work has been completed.

One member of the President's board of ten to select students is Dr. Ernest O. Lawrence, Nobel prize physicist who invented the cyclotron in which the atomic bomb element plutonium was first made.

Science News Letter, August 2, 1947

SCIENCE NEWS LETTER

Vol. 52 AUGUST 2, 1947 No. 5

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5 00 a year; two years, \$8 00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N. Y. C., PE 5566, and 860 N. Michigan Ave., Chicago, ST 4439.

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AGRICULTURE

2,4-D Destroys Cotton

Chemical makes no distinction between weeds and certain crops. Farmers learned its power by losing cotton crops when dusting rice in Texas.

► THE WONDER weed-killer 2,4-D can be a dangerous enemy as well as a useful ally. It can kill your plant friends as well as your foes in the plant world if you do not handle it with care. That is the lesson learned at a high cost in valuable cotton in Texas.

"Extensive damage" to Texas cotton fields from the use of 2,4-D on nearby rice was caused by faulty equipment used in dusting the chemical from the air, U. S. Department of Agriculture officials believe.

Planes carrying the potent dust over the rice field used cotton dusters built for dusting cotton fields against boll weevil, field reports to the Department of Agriculture indicated. When the plane circled back after making "runs" on the rice fields, some of the 2,4-D fell on cotton fields several miles away.

2,4-D will not harm rice, other small grains or the grass on your lawn. But it will kill not only weeds but other broad-leaved plants including cotton, soybeans, potatoes, and most other vegetables and flowers.

Don't Dust from Air

Scientists have warned against dusting 2,4-D from the air. In some cases, the dust will be carried to cotton and other crops by the wind. A better method is to spray rice fields with a liquid solution of 2,4-D in water or an oil.

Recent experiments have shown that oil is better than water for 2,4-D solutions, L. W. Kephart of the Department of Agriculture said, because water is more likely to drift, evaporate or wash off the plants which are sprayed.

The latest 2,4-D incident in Texas is only one of several which have been reported. But a protest from Texas cotton farmers brought a resolution from the U. S. House of Representatives calling on Secretary of Agriculture Anderson to take action to prevent further losses.

Department of Agriculture spokesmen blamed the damage to Texas cotton on "carelessness", but they admitted that the department has not issued any publications concerning the use of 2,4-D

on rice fields. A bulletin reported to have been issued by the Louisiana Experiment Station even showed on the cover a plane dusting the chemical.

Only official action planned so far is a press release warning against aerial dusting, it was learned. It is a local matter as far as regulations go, and several California counties are understood to have laws against dusting from the air.

2,4-D is a two-faced chemical with only a short history. On your lawn or in a rice or other small-grain field, the chemical will kill the weeds. But it will also kill other broad-leaved plants such as shrubs or flowers around your home or other types of farm crops.

Chemically 2,4-D is 2,4-dichlorophenoxyacetic acid. It was first used during the war and got some attention from chemical warfare experts as a possible killer of enemy plants. One of the plants which a weapon was sought against was rice, a big and important crop of the Japanese, but 2,4-D has proved to help rice by killing the weeds without harming the rice. On the other hand, 2,4-D could be a biological warfare weapon against many other important food crops such as potatoes.

If you want to kill dandelions and other weeds in your lawn use 2,4-D,

but use it with care. Do not use a dust that will blow over on your flowers or garden, or your neighbors', and do not use 2,4-D on any windy day.

The Texas cotton losses have produced one surprising new bit of information about 2,4-D. Young cotton plants hit by the weed-killer are living through the attack where some of the older, better developed plants are killed. This is not what some scientists expected.

Used with care, 2,4-D is an important aid to growing a good lawn or better crops, but it can do much harm if it is not well controlled.

Science News Letter, August 2, 1947

CHEMISTRY

Fermentation for Vinegar

► A METHOD for making vinegar that eliminates the present use of shavings or charcoal as substrates for the fermenting bacteria, developed by J. J. Mackin of Green Bay, Wis., is covered by patent 2,423,897. The alcohol solution, with the bacteria already in it, is kept suspended in turbulent air as mist-droplets while fermentation proceeds.

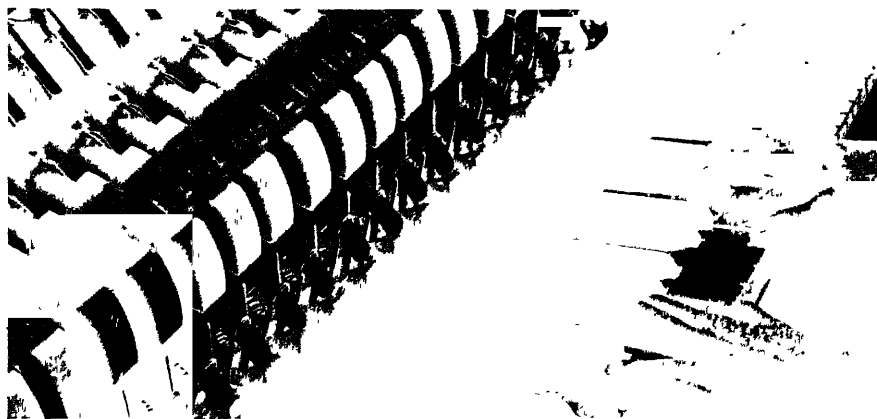
Science News Letter, August 2, 1947

ARCHAEOLOGY

Many-Storied Casa Grande

► THE FAMOUS Casa Grande ruin in Arizona indicates that it was a many-storied building resembling an apartment house with roof terraces and a few open windows; its thick walls were made of mud, patted into place by hand.

Science News Letter, August 2, 1947



PIANO POUNDERS—Tenite plastic, magnesium and aluminum piano actions are weather- and moisture-proof. Since they do not shrink or swell like the usual wood parts, they do away with sticky notes.



AFTER BURNER—Fuel enters the after burner attached to the tail exhaust pipe of the jet engine, somewhat as shown in the artist's drawing, where its combustion adds about one-third increased thrust to the otherwise 1,000-mile-per-hour discharge.

ENGINEERING

After Burner Adds More Thrust to Jet Engine

► **EMERGENCY SPURTS** of speeds of jet-propelled combat planes will result from a development of the Ryan Aeronautical Company which the makers call an "after burner." It is a type of a ram-jet engine attached, as an integral part, to the after end of the jet engine. It will be used when needed by the flip of a switch.

The combination might be described as a ram-jet attached to a turbo-jet power plant. The turbo-jet develops the high-pressure gases that give thrust to the plane and also operates the compressor that gathers in the air whose oxygen is needed for combustion.

The ram-jet effect is obtained by spraying fuel into the special tailpipe where its burning adds mass and velocity to the speeding gases of the jet stream. It burns because there is a plentiful supply of unburned oxygen in the jet stream from the turbo-jet.

Ryan officials claim that this is the first device of the sort specifically designed for regular use in flight. It can also be used in take-off. The added thrust, with jet planes already flying at more than 600 miles an hour, may assist a plane in breaking through the so-called air compressibility barrier encountered as planes approach the speed of sound. The device adds more than one-third to the power plant's normal propulsion thrust.

The development and testing of the device has now about reached the end of

ground-test stages. The tests were made in fixed engine stands on the earth. In them the stainless steel combustion chamber of the after burner becomes a roaring blast furnace shooting out a colorless, searing jet stream, revealed only by heat waves, at over 1,000 miles an hour.

Science News Letter, August 2, 1947

ANTHROPOLOGY

Peruvian Village Shows Culture Centuries Old

► **A SMALL** village on the coast of Peru, Smithsonian Institution scientists found, is a living museum of ways of life nearly 1,000 years ago and also the nursery in which a new culture can be seen in the process of developing.

Moche is located on the new Pan American paved highway only about 15 minutes' drive from the large modern city of Trujillo. But despite its lack of geographical isolation, the people up to now have kept themselves comparatively remote from modern influences so that life there still goes on in much the same old combination of Spanish and Indian ways.

The new road may be expected to make a difference.

The Moche culture is much older than the Spanish Conquest. They had the largest single adobe structure in the world and extremely realistic pottery designs. Evidence has been found of considerable agricultural development, including irrigation ditches.

Present residents of the village are direct descendants of these ancient people. They have lost their old language and

now speak more or less the same Spanish that is the language of other parts of Peru. But physically the ancient type persists.

Moche is a long way—five or six hundred miles—from Cuzco, famous center of Inca remains. But it is only a few miles from another center of archaeological interest, Chanchan, one of the most extensive sites of ancient culture.

The village was studied for the Smithsonian Institution by John Gillin, now of the University of North Carolina, who describes in detail his findings in a new report of the Institute of Social Anthropology.

Science News Letter, August 2, 1947

EDUCATION

Texts Behind Children In the Use of New Words

► **SCHOOL** books intended to build the vocabulary of children are 'way behind the children themselves in use of new words.

Editors of school "readers" don't realize that children read newspapers and magazines as well as many books, Dr. Robert H. Seashore, psychologist at Northwestern University, commented in discussing results of a study made in his department.

The average child adds 5,000 new words to his vocabulary every year, it was found. The average textbook of reading introduces only 500 new words in the same time. A child in first grade already knows about 16,000 basic words plus others derived from them, including some not in abridged dictionaries, the study revealed.

Vocabularies of both children and adults have been greatly underestimated because of faulty methods of measurement and misinterpretation. Those tested were not given a chance to show all that they know, Dr. Seashore indicated.

Counts of all the different words used by great writers show that Milton used only 11,000; Shakespeare, 16,000 and Victor Hugo, 20,000. From this people reasoned that if Shakespeare used only 16,000 words, then our own everyday vocabulary must be much smaller. Actually, we have no estimate of how many words Shakespeare considered in writing his works, Dr. Seashore said.

It is an interesting coincidence that in Shakespeare's works which are known and loved by so many people, he used exactly the number of words included in the average first grader's vocabulary.

Science News Letter, August 2, 1947

ASTRONOMY

Finding Faint Star Details

Photoelectric photometry has been improved so that the light intensities of even the sixteenth magnitude can be measured.

➤ ASTRONOMERS have an improved method for learning details about faint stars, on which even the most powerful telescopes bring only vague information. The method, called photoelectric photometry, enables scientists to measure weak light intensities with unprecedented accuracy.

Dr. Gerald E. Kron, assistant astronomer in the University of California's Lick Observatory and a leader in developing the improved technique, says photoelectric photometry permits operation of the 36-inch refractor at Lick as effectively as a 100-inch instrument could be operated by usual methods.

With this refracting telescope Dr. Kron has observed stars of the fourteenth magnitude, and stars of the sixteenth magnitude are within reach. The brightest stars observable with the 36-inch instrument by previous methods have been of the tenth magnitude.

Photoelectric photometry was pioneered in this country by Dr. Joel Stebbins of Washburn Observatory, the University of Wisconsin. Dr. Kron's refinement of the technique depends primarily upon the invention, just before the war, of an efficient electron multiplier.

Light gathered in a telescope lens from a star is made to fall upon a photosensitive surface, which is in effect a photocell. The electrons emitted from this surface are amplified by the electron multiplier. The instruments are so sensitive that a few hundred electrons per second can be measured.

Dr. Kron has already applied the technique to the study of stellar atmospheres, and has verified a unique theory of Harvard astronomers about the make-up of the atmosphere of one of the rare Wolf-Rayet type stars.

The Wolf-Rayet stars are unusual primarily because of their thick atmospheres and because they are two-star planetary systems, the stars eclipsing each other twice in each revolution.

Because of these eclipses the light coming from these stars is constantly changing. Dr. Kron's systematic studies of a Wolf-Rayet star through several revolutions disclosed that the thick at-

mosphere absorbs light independently of its wavelength, unlike the differential absorption with wavelength by the gaseous atmosphere of the earth.

Dr. Kron says that the peculiar behavior of light emanating from these stars can be explained on the basis of the theory propounded by the Harvard astronomers that the atmosphere of the Wolf-Rayet stars is made up of a cloud of electrons. He has also found that many stars which appear to have a uniform brightness over the whole surface actually have decreasing brightness toward the edges.

Aside from bringing out new fundamental facts, photoelectric photometry greatly speeds up astronomical research in problems where it can be used. In 10 seconds Dr. Kron took a reading on a fourteenth magnitude nebula which ordinarily would have taken about 10 minutes to record on a photographic plate.

Several lifetimes of new research have been opened up as a result of the application of the refined photoelectric photometric technique to astronomy, Dr. Kron says.

Science News Letter, August 2, 1947

ELECTRICITY

One in 365,000 Chances Of Death by Lightning

➤ YOUR CHANCES of being struck by lightning this summer are one in 365,000. Some 400 persons will probably be killed during the year in the United States. It is a small number, however, when compared with the probable 40,000 who will suffer death from automobile accidents.

The estimate is that of E. L. Harder, Westinghouse lightning engineer, whose primary job is the development of instruments and devices to protect homes, factories and electric power lines from lightning damage. As an example of accomplishments, modern protective devices now cut power interruptions on power lines almost to the vanishing point, although every 50 miles of such lines are hit some 50 times every year.



LIGHTNING HISTORIAN —
Lightning writes its own history on the wheel of this "fulchronograph". Striking a tall mast, the lightning sets up an electric current which magnetizes small slices of steel inserted in the slots on the rim of the wheel. By measuring the amount of magnetism, engineers can determine the strength and duration of the thunderbolt.

He explained a Westinghouse "trap" that virtually picks lightning from the sky, shuttles it about, and makes it take its own picture on an automatic camera. It makes "fingerprints" on high-speed and low-speed wheels within the instrument, which is called a "fulchronograph," making records, which along with the photographs, can be studied at leisure.

These "traps" are exposed in elevated positions, one being 535 feet from the ground on the roof of the University of Pittsburgh's Cathedral of Learning. Here lightning strikes a steel mast from which it is channeled through various protective devices to test their efficiency.

Information gathered over a period of years has catalogued thunderbolts so thoroughly that engineers can forecast with reasonable accuracy when and where they will strike on the average, and what their force will be. It is on the basis of this knowledge that the probability of death from lightning is estimated.

Science News Letter, August 2, 1947

Large male otters, including their heavy tails, are sometimes four feet in length.

OCEANOGRAPHY

Roughest Ocean Bottom Between Korea, New Guinea

➤ THE ROUGHEST place in the world, topographically speaking, is the stretch of sea bottom and islands that lie between Korea and New Guinea. It was a rough place during the late war, too—especially rough on the Japs as they got pounded back from the farthest south of their conquests.

Partly as a result of the many soundings taken by our warships as they cruised in that region, a new chart of the world's most rugged ocean bottom has just been published by the Hydrographic Office of the U. S. Navy.

It shows the world's deepest wrinkle, a 40,000-foot difference in elevation between the bottom of the Mindanao trench and the tops of the highest mountains in the eastern Philippines. There is a whole chain of such ocean-bottom trenches, off Japan, the Bonins, the Marianas, Yap and the Palaus, with northward extensions as far away as the Aleutians. Total length of the chain is more than 6,000 miles.

This area is also the world's roughest region in volcanic and earthquake activity. Earthquakes and volcanic eruptions are both more numerous and more violent there than elsewhere. One of the greatest earthquake disasters in history, the Tokyo Bay shock of 1923, took place near the northern end of the Korea-New Guinea region. And by far the most terrific volcanic explosion, that of Krakatau in 1883, occurred a little to the west of its southern end.

Science News Letter, August 2, 1947

ENGINEERING

Gas-Turbines May Lead Airplane Propulsion Field

➤ GAS-TURBINE engines are destined to play an increasingly important part in airplane propulsion, judging from discussions at the meeting of the Institute of the Aeronautical Sciences in Cleveland. Special problems being encountered were discussed by experts.

The great increase in activity in the aircraft gas turbine field in recent years has focussed attention on problems associated with the attainment of very high efficiency of the various turbine components, John E. Talbert and J. C. Smith, Wright Aeronautical Corporation, told the engineers. Design work is progressing at a rapid rate, they declared.

Combustion chambers for gas turbines are developed rather than designed, William R. Hawthorne, Massachusetts Institute of Technology, told the group. Early in the design of an engine, he stated, it is necessary to settle the overall arrangement and major external dimensions of the combustion system, for these in turn influence the general arrangement of the engine. He presented a method for determining the influence of combustion chamber dimensions on the engine performance.

Operation of aircraft gas turbines involves many factors requiring automatic compensation, such as wide variation in ram pressure, temperature, turbine speed and altitude, stated M. A. Edwards and J. D. Thompson, General Electric Co.

These and other variables must be satisfactorily controlled to give the best performance and reliability for this type of power-plant. The control system must make available the maximum range and rates of change in thrust, at the same time safeguarding continuous stable operation of the turbine and compressor. The control of jet nozzle area and propeller pitch are very important factors in this respect.

Science News Letter, August 2, 1947

MEDICINE

Vitamin D Treatment For Rickets Dangerous

➤ SOME PRESENT applications of vitamin D in the treatment of rickets in children are unsafe and may produce severe damage.

This has been disclosed by animal research by Dr. Agnes Fay Morgan, nutrition expert in the University of California College of Agriculture.

Dr. Morgan made her tests by feeding a single large dose of vitamin D to eight young dogs, from 29 to 34 days old, which were affected by rickets. She fed them 150,000 to 250,000 units of vitamin D per pound of body weight. Their diet otherwise was well balanced.

Damaging effects became apparent immediately, and so severe was the reaction that three dogs died within two weeks and a fourth three weeks later.

Dr. Morgan pointed out that infants frequently are given from 50,000 to 100,000 units of vitamin D per pound of weight to combat rickets, the total dose often being 600,000 units.

The lower dose for humans is not enough smaller to warrant complete confidence in the safety of this rickets treatment, Dr. Morgan asserted.

Science News Letter, August 2, 1947

IN SCIENCE

ZOOLOGY

Indian Elephant Babies Come to Philadelphia Zoo

See Front Cover

➤ TWO BABIES, each weighing about 1700 pounds, journeyed from Ceylon to the Philadelphia Zoo. Estimated to be two and a half years old, they are both Indian elephants. Patsy, five feet and five and a half inches tall, tops Peggy by two inches.

Patsy and Peggy are good live lawnmowers; they prefer grass to other kinds of food.

Science News Letter, August 2, 1947

RESOURCES

Government Buys Control Of Helium from Navajos

➤ HELIUM gas in the Rattlesnake oil field on the Navajo Indian Reservation in New Mexico is now under the control of the U. S. government, by agreement with the Navajo tribe and two private oil companies.

The Rattlesnake field, covering some 7,800 acres, produces gas containing 7.63% of helium, considerable carbon dioxide, and a large amount of nitrogen. This concentration of inert constituents renders the natural gas noncombustible.

In acquiring the rights to the field the government will pay the Indian tribe \$147,799 as advance royalty and rental for 25 years, and will pay \$166,594 to the oil companies for rights in their prior leasehold interests in the area.

Construction of a helium plant to process this gas was started by the U. S. Bureau of Mines in April, 1943. The demand for helium for war purposes was over by the time the plant was completed a year later. It was left in standby condition, but can be operated when needed.

The United States is the sole producer in the world of helium gas, the safety gas used in balloons and dirigibles. Other plants are in Texas and Kansas, a total of three. Two of these are now in standby condition. The Exell, Texas, plant alone can meet all present peacetime demands.

Science News Letter, August 2, 1947

E FIELDS

MEDICINE

Dose of BAL Reduces Lead in Bloodstream

➤ LEAD in the human bloodstream can be reduced in concentration with dramatic suddenness by single doses of BAL, the British antidote for the deadly war gas, lewisite, developed in this country during World War I. This has been demonstrated in the laboratories of the University of Cincinnati college of medicine by Drs. Henry W. Ryder, Jacob Cholak and Robert A. Kehoe.

Using seven human subjects whose blood contained lead in varying concentrations, they were able to produce a steep drop in blood-plasma lead in about seven minutes. Activity of the kidneys in getting rid of lead seems to have been increased, for the poisonous metal appeared in their secretion in higher concentration within an hour, with a return to the pre-dose level in from eight to 24 hours.

Unfortunately, BAL cannot be recommended outright for treatment of lead poisoning. The three researchers point out that this chemical, whose full name is dithiopropanol, is a "potentially dangerous drug." Repeated doses of it caused such disagreeable symptoms as high blood pressure and general muscular aching. They do regard it, however, as "potentially of great physiological importance."

Details of the work are published in *Science* (July 18).

Science News Letter, August 2, 1947

MECHANICS

Germans Make Combination Boring, Milling Machine

➤ GERMANY produced few new types of machine tools during the war, but one development discovered since has possible uses in America. It is a combination boring and milling machine for use in metal shaping in which one operation follows another without removal of the metal being worked from the machine. Details of the machine were revealed by the U. S. Department of Commerce.

Boring and milling machines are widely used in metal industries. They are

usually separated. Bores or drill holes are made for many purposes. Milling consists of machine processes of cutting and shaping for special uses.

In the German development, the combination boring and milling machines were made to increase precision and save resetting the work from machine to machine. Work is moved onward from one set of cutters to the next. Time is saved in the process, but the particular advantage is the precision resulting from the relief from the necessity of moving materials from one machine to another. A report of this machine and other new German machine tools may be obtained from the department for six dollars in photostat, or two dollars in microfilm.

Science News Letter, August 2, 1947

ENGINEERING

Peat As Fuel To Lower Iron Concentrates Costs

➤ PEAT FOR FUEL might be used to reduce at low cost the low-grade iron ores of Minnesota into concentrates for shipping when the high-grade ore of the Mesabi range is exhausted, the American Society of Civil Engineers was told at Duluth, Minn., by Robert L. Fitzgerald of the Duluth Steam Corporation.

He described experimental work on the use of peat already under way. Half the nation's peat deposits are in northern Minnesota, adjacent to the state's famed iron ranges, he said. Coal for the purpose would have to be obtained from distant points.

Russia, he stated, is processing from 50 to 60 million tons of bog peat into gas and power to serve industrial needs. High peat transportation costs are eliminated by converting the peat into electric power and fuel gas at the site of the bog. Production of the fuel has been greatly stepped up by mechanical handling. Soviet chemists are determining means by which various chemicals can be obtained from the peat.

Mr. Fitzgerald told the engineers about Minnesota work in forming peat into pellets, which may "be the answer to the local metallurgical use of this abundant supply of local low-grade fuel." Peat containing 85% moisture can be easily formed into pellets, he said, the size of which can be controlled. The smaller sizes dry rapidly, and the dried pellets are hard and will not fracture when subjected to rough handling.

Science News Letter, August 2, 1947

ENTOMOLOGY

Insecticidal Wallpapers Kill Flies on Contact

➤ WALLPAPER that kills flies that try to roost on it, and wrapping paper that will do the same thing to any insect nosy enough to investigate your groceries are among the newest things in DDT anti-insect tactics. Samples of such paper have been received for testing by the Bureau of Entomology and Plant Quarantine in Washington. The tests, however, will be conducted in the Bureau's laboratory at Savannah, Ga.

DDT is a known impregnant of these "fortified" papers. Apparently, however, something else has been added that has a quicker knockdown effect; for though DDT is sure, it is a bit slow. Chlordane, a quick-acting insecticide already in commercial production, seems the likeliest possibility.

It is claimed that samples of the new insecticidal wallpaper as much as two years old are still sure death to flies alighting on them.

Science News Letter, August 2, 1947

PUBLIC HEALTH

Polio Cases Below Normal As Epidemic Fear Lessens

➤ INFANTILE paralysis cases were less than half the five-year median figure for the week ending July 19, and the danger of a polio epidemic this summer is diminishing.

Total cases reported to the U. S. Public Health Service for the week ended July 19 were only 157, compared with a five-year median of 369. The week's cases showed an increase over the preceding week, when 125 cases were reported, but they were far below the 666 cases of polio for the corresponding week last year.

This year's total cases are only 1,575 through July 19, compared with five-year median of 2,048 and last year's 3,256.

In bad polio years, the number of cases usually begins to soar before this time, Public Health Service officials pointed out. There may yet be outbreaks of infantile paralysis in some localities, but this looks like a healthy summer for the nation as a whole.

California was reported to have the most cases, 24, while Ohio and New York have jumped to 13.

Science News Letter, August 2, 1947

MEDICINE

Treatments Paralyze Poliomyelitis

Discovery of five types of brain damage led to more specific treatment, cut death rate to 30% in usually fatal form of infantile paralysis.

By JANE STAFFORD

► **INFANTILE PARALYSIS** victims this summer have a better chance than ever before to escape death and severe crippling.

There should be no deaths in four of the five previously most dangerous forms of the disease.

Only one in five is likely to be left severely paralyzed.

Many can be relieved of the cold, clammy, swollen feet and hands that plague patients who have recovered from the acute stages of the disease.

Some patients, even some who had the disease years ago, can be given greater strength and use of long weakened, almost useless muscles.

Cure Not Discovered

These accomplishments have come without the discovery of any miracle drug to cure the disease or any specific remedy for warding it off. The cure and preventive of infantile paralysis, or polio as many call it, are yet to be discovered.

The biggest life-saving accomplishment was made in the frantic days last summer when cases throughout the nation were climbing to a near-record total of more than 25,000, and deaths were mounting into the hundreds.

Minnesota was for weeks the hot spot of the epidemic. Cases in that state alone reached a total of 2,875. Almost 200 of them were of the dreaded, usually fatal bulbar type. Patients with this type of the disease used to suffocate or choke to death, usually within a very short time. Although they were dying because they could not get enough air into their lungs, the ordinary iron lung did not help them and was even dangerous in some cases.

When these patients with bulbar polio began coming to the University of Minnesota Hospital, in three or four times the number usually expected in an epidemic, a special team of medical scientists was alerted from the University's staff. They are: Drs. A. B. Baker, Joe R. Brown, James O. Elam, Clifford Grulee, Jr., and Allen Hemingway. A wartime secret development of the Army Air

Forces and March of Dimes funds from the National Foundation for Infantile Paralysis were sent to help them.

At the end of the epidemic, only 56 of the 183 bulbar cases they treated had died. One of these should have lived, would have been saved if his parents had consented soon enough to one of the new treatments. Some of the 56 died before the doctors had made the discoveries that led to the new treatments. At that, the 56 deaths, representing a fatality of 30%, was far below the expected 90% to 100% fatality.

Clues from the dead bodies of the first victims led to the new methods of treatment which saved other victims, will save still more in the future.

Most important was the discovery that bulbar polio can take five different forms, each with different symptoms and needing a different and specific treatment. When this discovery was made, the doctors began saving patients.

Bulbar polio gets its name from the

fact that in this form, the virus cause of the disease attacks a small bulb or cone of nervous tissue at the base of the brain. This nervous tissue is called the medulla oblongata. Formerly it was supposed that the infection involved the whole medulla. The University of Minnesota scientists found that any of five regions of the medulla may be involved.

One type of bulbar polio they now call the cranial nerve nuclei type. In this type the nerves controlling the muscles of the face and throat are affected. The patient has trouble swallowing, which, not only makes it hard to feed him but, more important, brings the danger that he will choke to death from accumulations of mucus and other material. To save the patient, the doctor must keep the airways free of this obstructing material.

If this cannot be done by ordinary measures, such as suction through the mouth, an opening must be cut into the windpipe from outside the throat. This operation is called tracheotomy. The patient breathes through a tube inserted into the opening. Refusal to permit this operation in time cost the life of one victim in the Minnesota epidemic. He was the only one of the 100 patients with cranial nerve nuclei polio to die.

Lack of Oxygen

Also located within the medulla or bulb of the brain is the respiratory center which controls the rate of breathing. Patients with respiratory center type of bulbar polio lose control of the rhythmic rate of breathing. As a result, they do not get enough oxygen in their blood and may quickly die.

The rate of blood flow, as well as the rate of breathing, is controlled by a special region of the brain bulb. When this circulatory center is attacked by the polio virus, the patient's pulse rate changes, his blood pressure falls rapidly and he shows the general symptoms of a person in shock. Fortunately, this circulatory center type of the disease is rare, because it is the one most difficult to treat successfully. There is no specific treatment for it except oxygen, which has not been too helpful.

Fourth of the newly defined types of bulbar polio is the encephalitic type, in which the patient shows signs of confusion, apprehension and anxiety. The symptoms are chiefly due to lack of oxygen in the brain.



PHYSICAL THERAPY — Stair-climbing is part of treatment that overcomes handicaps.

The bulbar cervical spinal type is the fifth. In this type both the bulb and the adjacent areas of the spinal cord may be involved. The patients may have a mixture of the symptoms of the other types and in addition may have paralysis of the upper torso, particularly the muscles of the chest controlling breathing.

Treatment is given according to the symptoms of the patient which show the type of bulbar polio he is suffering. To save lives, doctors must be quick and keen in interpreting the symptoms and applying the suitable treatment. The tracheotomy operation, feeding by a tube through the nose and oxygen, are among the measures used. A special kind of iron lung has been built with a punched-in head to leave room for the tracheotomy.

Iron Lung Problems

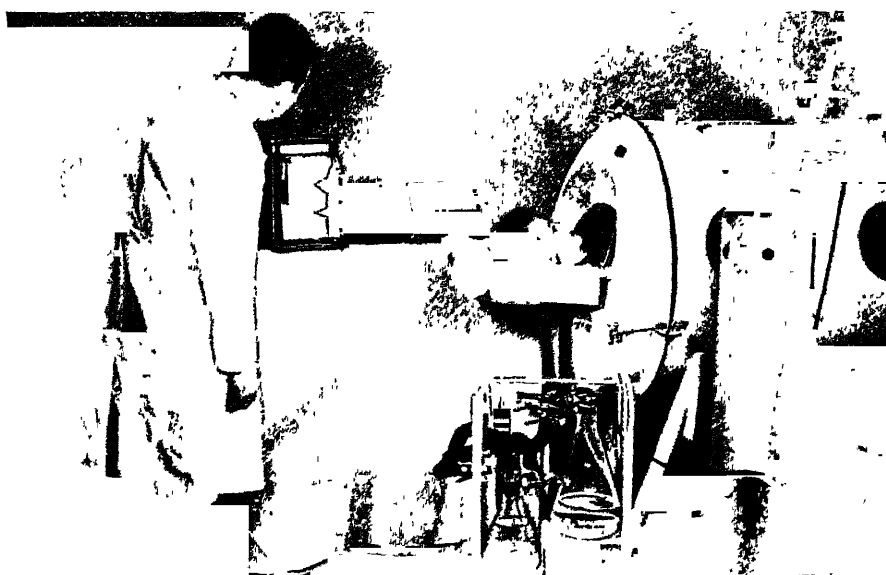
When a patient needs oxygen, how much he needs, and how long he can safely remain out of the iron lung when he is beginning to improve are vitally important questions which in the past have had to be answered by the nurse's or doctor's observations. Even with constant, skilled attendance, it is often hard to answer these questions accurately and quickly. The amount of oxygen within the blood and cells of the body may vary widely within a few seconds. By the time the oxygen lack produces symptoms that nurse or doctor can see, it may be so great that the patient is in grave danger.

A dual photoelectric device which clips on the patient's ear helped the Minnesota doctors answer vital questions about oxygen lack and save patients' lives. The device, called an oximeter, was invented by Dr. Glenn A. Millikan, son of the Nobel Prize winner, Dr. Robert A. Millikan, and himself a distinguished physiologist whose promising career was stopped by a fatal accident this spring.

Record of Oxygen

The oximeter, operating through two color filters, gives an immediate and continuous record of the amount of oxygen circulating in the bloodstream. It was first used by the Army Air Forces to combat oxygen lack in high altitude flying. Part of the recording equipment was a war secret. The instrument was released last summer to help fight polio.

With more patients being saved from polio death, physical therapy, which overcomes the crippling and paralysis the diseases leaves in its wake, becomes more than ever important. Modern methods



FIGHTING POLIO—New life-saving equipment for fighting polio consists of (1) new type iron lung with punched out head to permit access to (2) tracheotomy tube which provides open airway in the patient's throat for (3) giving oxygen that has been bubbled through humidifying apparatus and (4) oximeter clipped to patient's ear to show at once when oxygen in patient's blood falls to dangerous level. Dr. James E. Olam, University of Minnesota physiologist, is reading the oximeter record.

now make it possible for 50% of the victims to recover without any handicap and for another 20% to escape with mild, non-handicapping paralysis. But these good results depend to a large extent on early diagnosis and early, continuous use of physical therapy.

Treatment for infantile paralysis is expensive, but no parent need worry about the cost. The National Foundation for Infantile Paralysis will pay part or all of the cost of treatment for any patient needing such aid. The chief jobs for parents are to avoid getting panicky or letting the children get panicky, to be alert for symptoms that might mean polio, to call the doctor promptly if these symptoms develop and to follow his advice about treatment.

Science News Letter, August 2, 1947

MEDICINE

Better Germ-Killers Built in Laboratory

➤ NEW CHEMICAL drugs that may be better than the wonder germ-killer, penicillin, are being built in the laboratory, the International Chemical Congress in London was told by several teams of chemists.

Intermediate compounds that lead toward new forms of penicillin have been prepared, Dr. A. H. Cook reported for

a group working under Sir Ian Heilbron of London's Imperial College of Science.

The synthesis of benzilpenicillin was announced by Prof. Vincent du Vigneaud of Cornell Medical College, New York City, who first synthesized penicillin itself.

Many steps toward making artificial streptomycin, the other wonder mold chemical, have been taken, Dr. Karl Folkers of Merck Laboratories in New Jersey, told the congress. The synthesis of this drug will be more difficult than that of penicillin, he admitted.

Science News Letter, August 2, 1947

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ENTOMOLOGY

"Everybody Works" Fly War Being Waged in Evansville

➤ AN "everybody works" fly war is being waged in Evansville and Vanderburgh County, Ind., to rid this community of that dangerous and pesky insect menace, the housefly.

The local war on flies was started by the Evansville Press as a part of the Science Service National Anti-Fly Campaign. The fight on flies in this section is now being conducted with the cooperation of the city-county health department, city and county administrations and the Evansville Chamber of Commerce.

As A. P. Eberlin, secretary-manager of the Chamber of Commerce, explains, "An 'Everybody Works' campaign will do the job."

City workmen launched the attack by spraying DDT solution on city dumps, garbage cans, ash pits, trash bins and alleys. Local fly and mosquito breeding areas were treated with DDT.

Creameries, dairies, restaurants, taverns, soft drink places, clubs, hospitals and other establishments were covered by the DDT offensive.

Everyone in the area has been urged to wage war on flies in a five-point individual anti-fly program:

1. Supply your industrial or business property and home with sufficient DDT solution, in aerosol bomb, spray or paint form. It can be obtained at modest cost from drug stores, paint stores, groceries, service stations, etc.

2. Follow carefully detailed instructions that come with every package or can of DDT.

3. Use DDT liberally in your business or industrial establishment and in

your home—in your kitchen, basement, dining room, on your porches, screens and in your garage. Make both your home and your place of business fly-free.

4. Encourage your friends and business associates and employees to follow the same program.

5. Boost the campaign in your lodges and clubs and publicize it in club news letters and house organs.

Science News Letter, August 2, 1947

ENTOMOLOGY

Boy Scouts Shock Troops In Birmingham Fly War

➤ ARMED with DDT-filled spray guns, boy scouts are the shock troops in Birmingham, Ala.'s all out war on flies.

As the Birmingham Post's Anti-Fly editor, Mel Snyder, explained, the city's Health Department became "the arsenal for a fly-less democracy" when health officials supplied 750 gallons of DDT solution to be "shot" at the insect enemy by scouts.

The Post launched the fly war in Birmingham as a part of the Science Service National Anti-Fly Campaign.

When boy scouts volunteered to do outdoor spraying, the Post challenged, "Housewives . . . you get the ones indoors."

With the support of civic leaders and city and county officials, the Birmingham campaign was headlined by a two-day chemical assault on flies by the boy scouts.

Birmingham's scout troops were assigned various areas and met at central locations in each area to receive their supply of DDT. Sprayers for the fly war were supplied by the scouts themselves. For two days, adult leaders at the 16 DDT distributing points were kept busy directing the "ammunition loading" as the scouts searched out fly-breeding spots.

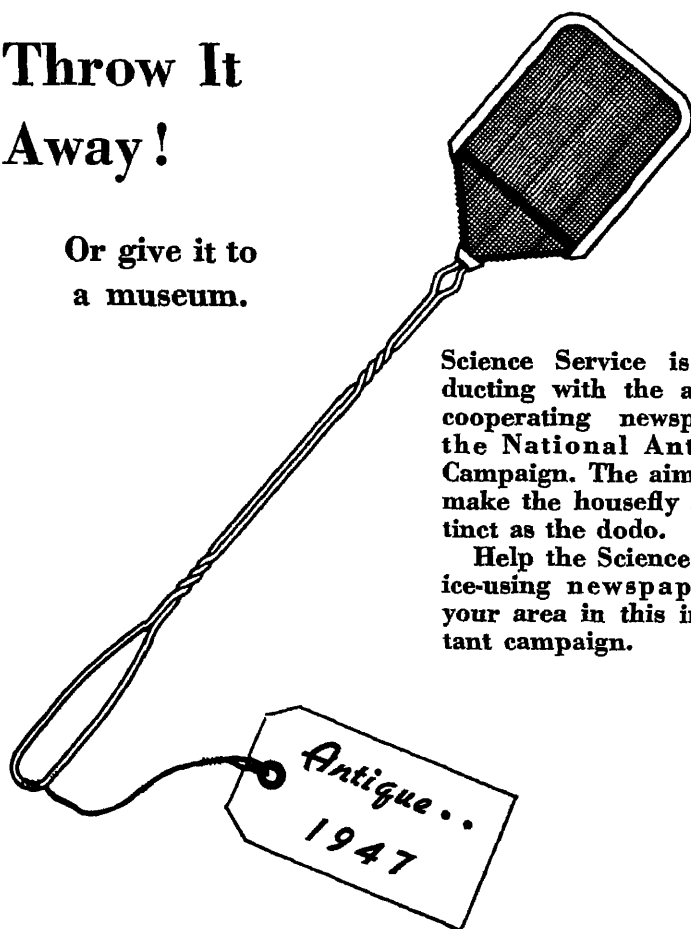
While flies in Birmingham were reduced by the two-day attack, health officials and leaders in the campaign explained that the big achievement of the campaign was to give the people of the city "the DDT habit."

Science News Letter, August 2, 1947

An electric lamp for underwater work has been developed; it can be used only under water because the liquid is necessary to keep the glass cool from the 1,000-watt light within, with filaments almost touching the bulb.

**Throw It
Away!**

**Or give it to
a museum.**



Science Service is conducting with the aid of cooperating newspapers the National Anti-Fly Campaign. The aim is to make the housefly as extinct as the dodo.

Help the Science Service-using newspaper in your area in this important campaign.

Complete instructions on how to get rid of flies are contained in Dr. Frank Thone's articles carried in cooperating newspapers or in the June issue of **CHEMISTRY**, Science Service monthly. Send 25 cents to Science Service, Washington 6, D. C., and ask for the Anti-Fly or June issue of **CHEMISTRY**.

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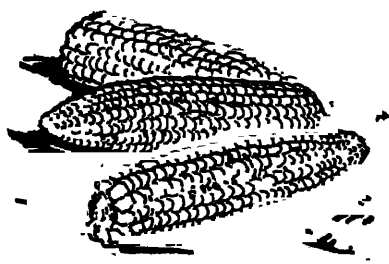
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Sweeter Sweetcorn

► URBANITES who grew up in Iowa or Wisconsin or Maine or New Jersey have long complained that the sweetcorn they get in New York or Pittsburgh or Chicago wasn't really fit to eat. That was no mere effect of nostalgia. They were quite correct: sweetcorn as it has been offered in city markets

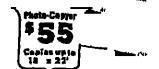
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for many years hasn't been really good.

Trouble is, it has taken too long for the corn to get from cornstalk to kettle. Past harvesting and marketing methods usually made a 48-hour time gap at least, often more than that, especially if the corn were being shipped from a distant point. That is much too much, if the corn is to remain really sweet.

Other vegetables can be picked short of maturity and permitted to ripen on the road or even on the dealer's stand. Their sugar content increases during the ripening process. With sweetcorn the reverse is true. The more mature it becomes the less sugar it contains and the more starchy it is. It must not only be picked immature, it must be eaten that way or it is no good.

There is an enzyme in sweetcorn that gets to work on its sugar the moment the cob is severed from the stalk, converting it into starch. Corn canners found that out long ago. They begin a day's operation with corn picked very early the same morning—even by lantern light. Every ear left on the floor when they shut down for the night is discarded. Corn 24 hours old is unfit to pack, by modern cannery standards.

At long last, city consumers of fresh sweetcorn are beginning to get the same kind of a break. Under the leadership of some energetic "dirt scientists" at several state agricultural experiment stations, dawn-picked ears are rushed direct to retail dealers by truck and are ready for sale when the early housewives come a-marketing. These early birds get the wormless ears, and the juiciest

Not even this would satisfy some corn gourmets, who insist that if an ear is off the stalk longer than ten minutes it is no longer sweetcorn, but just corn. A few extremists even carry kettles of hot water into the corn-patch with them, husk the ear before snapping it off, and pop it into the water instantly.

To do this kind of thing, however, requires that you grow your own corn. For people who have to live and work far from the nearest possible garden-plot, the newer marketing methods offer the best possible substitute.

Science News Letter, August 2, 1947

A Maryland orchardist saved an apple orchard threatened by frost last spring by cruising back and forth over it at 50 feet in a plane; the plane warmed the air from its exhausts and by keeping it in motion.

Do You Know?

Men have kept fishes as pets for over 2,500 years

A female giant panda in the New York zoo weighs 375 pounds

Male Australian duck-billed platypuses have a poison spur on each hind leg.

Commercial canning of fruit and vegetables in France now exceeds pre-war quantities.

Ice cream manufacture in the United States during 1946 was enough to give every person 21 quarts.

Engineers and farmers are reshaping the surface of the earth in the present era to a greater extent than nature

Boric acid, used as an eye wash, contains boron, a non-metallic element used in hardening certain steel alloys.

"Polder" is the European term applied to reclaimed land lying below sea level, protected by dikes and kept dry by mechanical pumping.

Animals of the African plains are unafraid of automobiles, a wildlife painter states; it is against the law to hunt from a car

Suvasol is a kerosene derivative used to kill weeds among carrots, 2,4-D kills broad-leaved weeds on lawns, and ammate kills poison ivy

The Belgian horse, massive, compact and powerful, was developed in the past century by crossing selected animals of the ancient Brabant type.

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CAREERS FOR YOU AND YOUR CAMERA—Graflex, Inc.—publ by the firm, 30 p, illus, paper, 15 cents. A discussion of the various special fields in which competent photographers make a living.

DISEASES TRANSMITTED FROM ANIMALS TO MAN—Thomas G. Hull—Thomas, 3rd ed, 571 p, illus, \$10.50. Expanded material due to information concerning the spread and control of the rickettsial and virus infections obtained during the war together with history, epidemiology, bacteriology, pathology and clinical symptoms make this a very serviceable handbook.

EXISTENTIALISM—Jean-Paul Sartre—*Philosophical Lib.*, 92 p, \$2.75. An exposition of his philosophy which is to face the implications for personal action in a universe without purpose.

EXPERIMENTAL CASTING PLASTICS—Thomas A. Dickinson—*Plastics Res. Co.*, 24 p, illus, \$2. The result of an engineering research project, this book is devoted to specific formulae and new simple methods of making rigid or flexible patterns, molds and casts. It is an attempt to combine the features of the text book or reference and limited-circulation report.

FOUNDATIONS FOR TEACHER EDUCATION IN AUDIO-VISUAL INSTRUCTION—Elizabeth Goudy Noel and J. Paul Leonard—*Am. Council on Educ. Studies.*, Series II, 60 p, paper, 75 cents. A guide for the use of those who are initiating, developing, or revising programs designed to

prepare teachers competent in the use of audio-visual methods.

GREAT ENGINES AND GREAT PLANES—Wesley W. Stout—*Chrysler Corp.*, 133 p, illus, free. A fine discussion of the development of the aircraft industry during the war with many photographic details of structure.

MEN AND VOLTS AT WAR—The Story of General Electric in World War II—John Anderson Miller—*McGraw-Hill*, 271 p, illus, \$3.75. A dramatic story of the role of G. E. in helping to equip and maintain our fighting forces with the best possible technological equipment.

PLASTICS THEORY AND PRACTICE—The Technology of High Polymers—Charles C. Winding and R. Leonard Hasche—*McGraw-Hill*, 280 p, illus., \$5. A text giving a broad view of the entire field of plastics relation of chemical structure to physical properties, the six groups, commercial methods of manufacture, and evaluation.

SPECIAL TREATMENTS OF WOOD—*North-eastern Wood Utilization Council*, Bulletin 18, 103 p, paper, \$2. Papers presented at one of the quarterly meetings of the above organization collected to inform wood-using industries of new processes and developments, emphasis on impregnation, fire-retardant processes, wood-bending, etc.

A STONE AGE CAVE SITE IN TANGIER—Bruce Howe and Hallam L. Movius, Jr.—*Peabody Mus. of Am. Arch. and Ethnol.*, Papers, Vol. XXVIII, No. 1, 32 p, illus, paper, \$1. A preliminary report on the excavations at the Mugharet El 'Aliya, or High Cave, in Tangier, excellent drawings of artifacts are appended.

VIRUSES—Max A. Lauffer—*Penn. State College*, 62 p, paper, \$2. From the Twentieth Annual Priestley Lectures sponsored by Phi Lambda Upsilon Honorary Chemical Society, a series of essays discussing viruses as molecules, as organisms, their size and shape, disintegration and relation to human welfare.

Science News Letter, August 2, 1947

no longer essential to the modern system of health protection.

The WHO inquiry drew attention especially to the bills of health and consular visas now required by existing conventions. Abolition of these formalities was advocated by the 1944 Sanitary Convention and some countries have abolished the requirements by individual agreements. The possibility of general abolition was raised in the WHO letter.

Acting on the recommendation of its Committee on Epidemiology and Quarantine, the Interim Commission has appointed an expert committee to meet in September to consider amendments suggested by the governments in their replies.

Science News Letter, August 2, 1947

The Dent de Crolles near Grenoble, France, is said to be the deepest hole in Europe, being 2193 feet deep; this is 70 feet more than the Italian Great Hole of Preda.



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PUBLIC HEALTH

World Health Group Plans Easier Travel

➤ CHANGES in world sanitary regulations which will make it easier for international travellers to go from country to country are being studied by the World Health Organization Interim Commission.

Countries signatory to the WHO constitution have been asked by the Interim Commission for their views on alterations in current international sanitary conventions. Officials said they were checking to see to what extent world travellers have to submit to practices

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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 373. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

☼ **TYPEWRITER LAMP**, recently patented, is a tubular fluorescent light held over the machine on an adjustable stand, the tube being about the length of the typewriter platen. The lamp can light up the typing, show through a stencil, and illuminate the page being copied.

Science News Letter, August 2, 1947

☼ **DOLLIES**, or roller devices for moving heavy boxes in factories or shops, consist of sturdy metal frames four inches high, each equipped with two steel rollers. Short pins on frame tops keep boxes from slipping. An adjustable rod to hold two dollies a fixed distance apart is available.

Science News Letter, August 2, 1947

☼ **BOOKBINDING** adhesive is applied with a brush or mechanically, and dries in ten minutes to make a "tack-free" union that is strong, flexible, stable and lasting. No heating or thinning with water is required.

Science News Letter, August 2, 1947

☼ **HANDY SPRAYER** for household use in controlling insect pests is a rubber bulb with a conical top which screws to the container. The nozzle on the top is set at an angle so that the spray can be directed where wanted. A squeeze of the hand provides the necessary pressure.

Science News Letter, August 2, 1947

☼ **EAR LAMP**, for relief of ear aches and inflammation, concentrates infra-red



or heat rays where needed rather than over a large area, as when hot water bottles or heating pads are used. The picture shows how it is held in position by head-bands.

Science News Letter, August 2, 1947

☼ **DISPLAY CASE** for vegetables and fruit circulates moisture-laden air that keeps the contents crisp and fresh without soaking. An automatic foot-control spray shut-off protects customers while they are selecting produce.

Science News Letter, August 2, 1947

☼ **BEDS** and bed springs of aluminum are easily shifted about because of the light weight. Only the frame of the bed springs is made of this metal, but total weight is kept down to 38 pounds by replacing the ordinary spring coils with spring wire bent in a series of S-shaped loops.

Science News Letter, August 2, 1947

☼ **DIVING EQUIPMENT**, reported from France, consists of a rubber covering for eyes and nose, and breathing facilities. Air, under 440 pounds pressure, is carried in flasks on the back and delivered to the mouth by tubes. Breath is exhaled through valves into the water. User can remain under water for 90 minutes.

Science News Letter, August 2, 1947

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Membership is strictly limited to 10,000 and will be for at least the next nine months. This is America's most unique "club."

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Question Box

AERONAUTICS

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AGRICULTURE

In what way is 2,4-D an enemy? p. 69.

ANTHROPOLOGY

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ASTRONOMY

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EDUCATION

What is rate at which the average child adds to his vocabulary? p. 70.

ELECTRICITY

What is your chance of death by lightning? p. 71.

Pictures: Cover, Philadelphia Zoological Society; Monsanto Chemical Co., p. 67; Tennessee Eastman Corp., p. 69; Ryan Aeronautical Co., p. 70; Westinghouse, p. 71; National Foundation for Infantile Paralysis, p. 74.

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ENGINEERING

For what is an after burner used? p. 70.

MEDICINE

What are the early symptoms of polio? p. 66.

What new treatments are in use against polio? p. 74.

What possible cancer weapon can scientists find in the sea? p. 68.

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Where is the world's roughest stretch? p. 72.

OPTICS

Why were ultraviolet searchlights not used during the war? p. 67.

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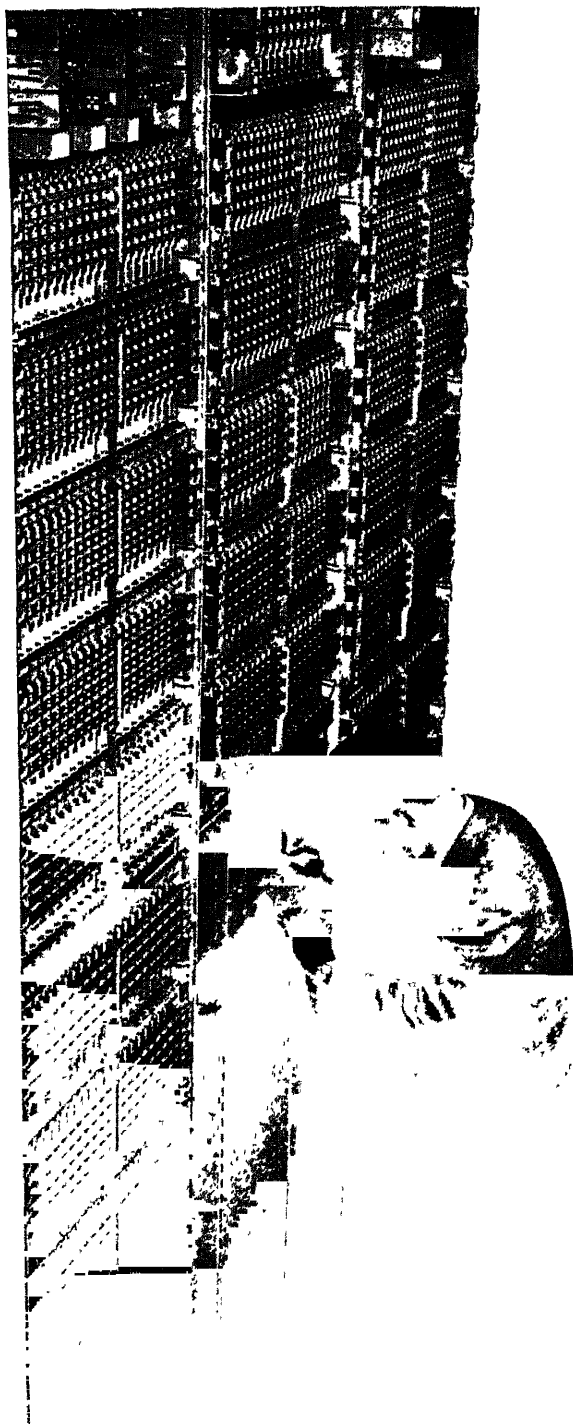
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SCIENCE NEWS LETTER



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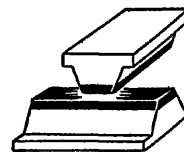
An engineer examines contacts in a crossbar office. Horizontal bars seen in the crossbar switches select contacts which are then operated by vertical bars to establish talking paths between subscribers.

A BILLION ORDERS A DAY

In a large modern telephone office 2,000,000 switch contacts await the orders of your dial to clear a path for your voice. They open and close a billion times a day.

At first, contacts were of platinum—highly resistant to heat and corrosion but costly. Years ago, Bell Laboratories scientists began looking elsewhere, explored the contact properties of other precious metals—gold, silver, palladium and their alloys—and with the Western Electric Company, manufacturing unit of the Bell System, restudied shape, size and method of attachment.

Outcome of this long research is a bar-shaped contact welded to the switch and positioned at right angles to its mate. For most applications, an inexpensive base is capped with precious metal.



Savings from these contacts help keep down the cost of telephone service. This is but one example of how Bell Laboratories serve the public through your Bell Telephone Company.

BELL TELEPHONE LABORATORIES



EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

MEDICINE

Atomic Attack on Disease

Radioactive chemicals may tell much about how diseases spread. Many medical advances have already been made with isotopes in a year.

Report of the peacetime accomplishments of atomic energy continues on the next page, telling the results of research in agriculture.

➤ MANY of the great disease killers of mankind, from heart disease and cancer to still unconquered germ diseases, may yield to atomic attack.

Radioactive chemicals, produced in the same chain-reacting pile at the Clinton Laboratories which produced the atom bomb just two years ago, are the weapons for medicine's atomic attack on disease.

Such unsolved medical mysteries as how infantile paralysis spreads might be solved with these peaceful atomic weapons. The solution would come by tagging the virus cause of the disease with a radioactive chemical from the pile. Its now hidden invasion route and progress through the body could then be followed by the tell-tale radioactivity with which it had been endowed. Sure knowledge of whether the virus gets into the body by being swallowed with food or water or whether it comes in on breaths of air, like the common cold virus, would give scientists a much better chance of stopping its spread.

First steps toward such knowledge may already have been taken. Scientists at the U. S. Public Health Service's National Institute of Health have found a way to tag bacteria with radioactive chemicals. They want to learn more about immune processes by which the body fights germ invasion.

Tagging viruses might be an even more difficult feat, but it has been accomplished in the case of at least one virus, that of tobacco mosaic, which is a plant disease.

In the single year since the first shipment of radioactive isotope chemicals produced in the Clinton Laboratories at Oak Ridge was made to the Barnard Free Skin and Cancer Hospital in St. Louis the following atomic advances in medicine have been made:

1. Discovery of a better treatment for congestive heart failure. This resulted from the finding, by Dr. George E. Burch of Tulane University School of Medicine, that in patients with this heart

condition sodium as well as water escapes from the blood vessels into the tissues. Because sodium is a "thirsty" element, water follows the sodium out of the blood vessels. This results in the dropsy of congestive heart failure. As a result of these studies with tagged atoms of sodium, patients are now given medicines to eliminate the excess sodium as well as the excess water in their tissues.

2. Treatment of chronic forms of leukemia, lymphoma and Hodgkin's disease with radiogold, which has turned out to be "exceedingly useful" in these conditions.

3. Development of methods for learning more about how cancers are produced through the use of a cancer-producing chemical, methylcholanthrene, tagged with radioactive carbon 14.

4. Quantitative measurements of blood circulation with red blood cells tagged with radiophosphorus which showed conclusively that in heart disease when heart arteries are clogged (coronary thrombosis) other blood vessels take over the job of the blocked ones.

5. Successful treatment of patients with overactive thyroid glands, too sick for surgical removal of the gland, with ra-

dioactive iodine which has also been used to attack cancer of the thyroid.

6. Discovery of new knowledge for fighting anemia through use of radioiron which appears in the red blood cells and shows the rate at which these cells are made and how iron is absorbed and utilized in the body.

7. Tagging of penicillin and other drugs to learn more of how they stop or kill germs in the body and, perhaps, how to develop more effective drugs.

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CHEMISTRY

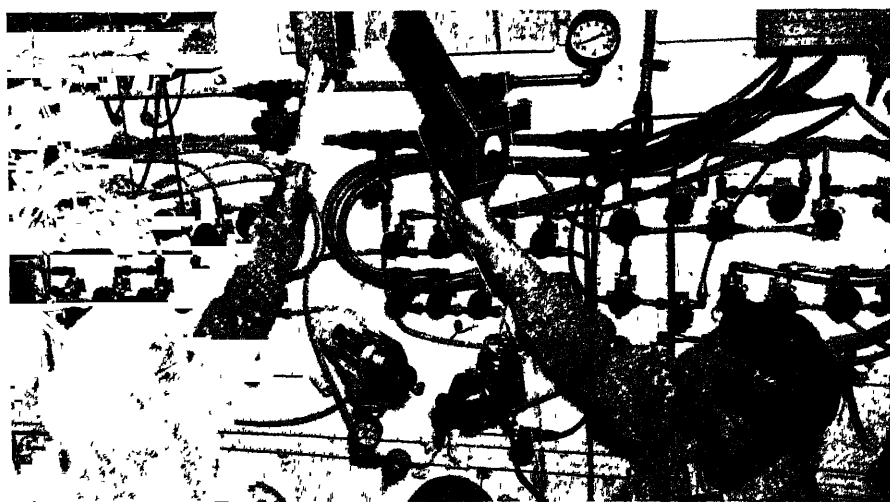
Powerful Anti-Malarial Found in Chinese Plant

➤ EXTRACTION of two anti-malarial chemicals, one of them 100 times as powerful as quinine, is announced by J. B. Koepfli, J. F. Mead and John A. Brockman, Jr, California Institute of Technology chemists, in a report to the *Journal of the American Chemical Society*.

The chemicals were obtained from the leaves and roots of a plant long known to the Chinese as having anti-malarial properties. In China, its roots are called Ch'ang Shan. Botanical name for the plant is *Dichroa febrifuga*.

Febrifugine and isofebrifugine are the names the chemists give the new anti-malarials. The names, as well as the last name of the plant, come from two Latin words meaning fever-reducing. Febrifuge is an old medical term for any fever-reducing remedy.

Science News Letter, August 9, 1947



CHECKING RADIATION—Fission product materials emitting high levels of radiation are processed inside a thick walled concrete cell. This shows apparatus on the outside wall where all operations are performed by remote control. Radiation emitted through an opening is being checked with an instrument called a "cutie pie."

Linlithgow Library

RADIOBIOLOGY

Unlocking Plant Secrets

"Tagged" molecules are tracing plant life processes. Peacetime uses of radioactivity will outweigh destructive use of atomic fission.

➤ **SUGAR FORMED** in one leaf of a large sugarcane plant during one hour's work in the sun was distributed to all parts of the 11-foot, seven-pound stalk within three days. This hitherto unsuspected fact of plant life was demonstrated through the use of carbon atoms "tagged" with radioactivity at the Clinton Laboratories atomic pile and sent to Honolulu for research purposes.

Traced Through CO₂

In the Honolulu laboratories of the Hawaiian Sugar Planters' Association, Dr. George O. Burr and his co-workers combined the radioactive carbon with oxygen to make carbon dioxide. This "tagged" CO₂ they fed to one leaf of a large sugarcane plant for one hour on a sunshiny day. The sugar thus formed was found wherever it went in the plant by pointing a Geiger counter at various parts. Most of the "ticks" that betray the presence of radioactive matter came from the young, growing parts of the cane: root-tips, stem-tip, newest leaf. But there was radiosugar in all parts except a few of the oldest leaves.

Now the Honolulu researchers are making up larger quantities of radiosugar, to be sent to other laboratories for nutritional studies on animals. It will be traced through their bodies just as it was traced through the sugarcane stalk. One sample of radiosugar has already been sent to Dr. Harlan G. Wood of Western Reserve University in Cleveland, Ohio, who will pry its complex molecules apart to see just where the radioactive carbon atoms are built in.

This is only one sample, out of scores of research projects that have been started since radioactive elements were first made available for use in peacetime investigations of biological, medical, agricultural and industrial problems, only one year ago, and less than two years after the blasting of Hiroshima. More than 1,000 shipments of radioactive elements and compounds have been made thus far.

Another plant research project of both theoretical and practical importance in-

volves the use of radioactive iron. Iron is needed in small quantities by all green plants; it is an indispensable catalyst in the formation of chlorophyll, the green pigment that captures sun-energy and uses it in making sugar. Phosphorus, another element essential to plant life, under certain conditions "acts cussed", and blocks the iron entry through the roots. Then the plant becomes pale and anemic-looking—chlorotic, in the plant physiologist's jargon. Chlorosis is more than a laboratory term. Fruit trees suffering from it cost American orchardists millions of dollars every year in lost yields. So Dr. Orlin Biddulph of the State College of Washington is working on this phosphorus-iron antagonism with tracer atoms of radioactive iron.

From Soil to Milk

At the University of Florida, a radio-tracer research task begins with the soil in a cow pasture and winds up in baby's bottle. Radioactive elements, especially cobalt and copper, necessary though only in minimal amounts, are introduced into the soil. Thence they are traced into the grass and legumes that grow from the soil, into the cow that eats the plants, through her into her milk and thus to the ultimate consumer.

These three examples of radiobiological research are only random samples taken from scores of similar projects being carried on in dozens of laboratories and field stations. Among other radioactive elements from the atomic pile in Oak Ridge that are being used in these researches are sulfur, iodine, calcium, potassium, sodium and beryllium.

Industry as well as biology and agriculture is making use of "tagged" atoms. Radioactive iron incorporated into steel is used in studies of frictional wear. Radioactive calcium in cement helps to place more accurately the sealing-off layers of concrete deep in oil wells, that block ruinous water-flows. Radiosulfur is helping metallurgists to understand better what happens to this nuisance element in iron smelting. And so on almost indefinitely.

Peacetime uses of atom-splitting have of necessity lagged behind the develop-

ment of the atom bomb. But they bid fair to overtake and pass this first destructive use of atomic fission.

Science News Letter, August 9, 1947

RADIO

Jeep Gets Voice and Ears

➤ **VOICE AND EARS** have been added to the jeep in the form of a high-powered two-way radio, to be used in the Navy. Self-powered, the new radio can be used even when the vehicle is running six feet under water. The receiver is so small that it can fit into the glove compartment.

Science News Letter, August 9, 1947

SCIENCE NEWS LETTER

Vol. 52 AUGUST 9, 1947 No. 6

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566, and 860 N. Michigan Ave., Chicago, S'tate 4439.

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MARINE BIOLOGY

"Red Tide" Destroys Fish

This phenomenon, described in the Bible, is caused by sudden increase in the number of red one-celled organisms that poison fish.

► "RED TIDES" like the present one that has been killing myriads of fish off the Gulf coast of Florida are far from being a new thing under the sun. Thomas F. Austin, of the U. S. Navy's Hydrographic Office, has been searching all records for mentions of such outbreaks, and finds first mention in the Book of Exodus, chapter 7, verses 20-21: "... and all the waters that were in the river were turned to blood. And the fish that was in the river died, and the river stank, and the Egyptians could not drink of the water of the river, and there was blood throughout all the land of Egypt."

"Red tides" are caused by sudden increases in number of red-colored one-celled organisms that are near the borderline between plants and animals, down near the bottom of the evolutionary scale. They have big names because only biologists pay any attention to them as a rule; two quite common genera are known as *Gonyaulax* and *Peridinium*, belonging to the order *Dinoflagellates*.

They are normally present at all times but in small numbers. When something happens that offers them highly favorable conditions for growth, like an upwelling of bottom water bringing up more food materials, they multiply at a terrific rate, until they color the water red, as swarms of corpuscles make the blood red.

They appear to produce an active poison, which has not yet been identified. Fish placed in water containing them die quickly, presumably absorbing the poison through their gills. They are also held responsible for the occasional outbreaks of mussel poisoning on the California coast. Rock mussels, a favorite shell-fish, suck them in as food—and anyone eating mussels at times of "red water" takes chances with his life.

Tales of the "red tides" and the windrows of dead fish being caused by dumping of war gases into the Gulf are absurd on their face. The government did dump huge quantities of lewisite and other gases after World War I, but it took them far out in the open Atlantic and sent them to the bottom in sealed

containers. When corrosion finally released the deadly stuff it was so diluted in the ocean's vast bulk of water that it was never noticed, even by the fish.

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PALEONTOLOGY

Corals Built Skyscrapers Of Lime Many Years Ago

► Modern architects may not be so modern after all. Today's skyscraper apartment houses look very much like an apartment house built about 400,000,000 years ago in the Silurian sea by a colony of tiny corals called Favosites.

The Favosites had an answer to the housing problem; their building was a by-product of their favorite pastime, eating. The animals deposited lime as a product of digestion and respiration. This deposit made a protective coating for their soft bodies.

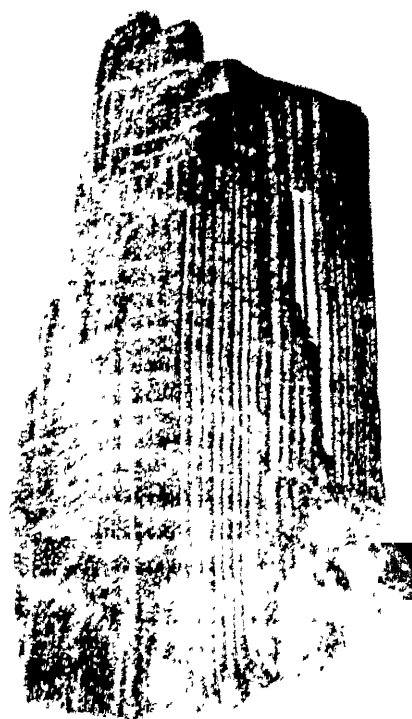
Being so tiny, it was to their advantage to live in colonies, so each coral's lime nook touched its neighbor's. As the animal ate and breathed, the lime coating grew. In time, the coating would become too great for it to reach around to grab food, so the Favosite would pull itself to the top of its tube and build itself a floor to stand on to catch its microscopic wild game.

This repeated moving to the top caused the one-tenth inch long animals to finally reach the top of a structure that might be several feet high.

The dots that look like windows on the structure are holes the corals left for buds to grow out of. A bud is a young coral that grows out from the side of the parent. Some of these buds were crowded out by next-door neighbors. The regularity of the "windows" indicates that the whole colony got the impulse to sprout buds at the same time.

The abandoned lower apartments filled with crystalline calcite, even during the lifetime of the animals themselves. This gave these tiny marine architects a firm foundation to build on.

Scientists can look at the houses of these animals and determine what the



"SKYSCRAPER"—Ages ago, corals built residences that resemble today's modern apartment houses.

dwellers must have looked like, reports Eugene S. Richardson Jr., curator of invertebrate fossils at the Chicago Natural History Museum.

Science News Letter, August 9, 1947

MATHEMATICS

Weird Models Represent Mathematical Equations

See Front Cover

► NOT MODERNISTIC dancers, or weird animals from the moon, the models on the cover of this SCIENCE NEWS LETTER represent mathematical equations. Instead of being described by a single equation, however, they are formed by the operation of certain combinations of equations under specific mathematical controls. Rutherford Boyd posed these mathematical models at Columbia University. They are shown here by courtesy of the journal *Scripta Mathematica*.

Science News Letter, August 9, 1947

Ten years ago China supplied the United States with about 99% of its imports of dried eggs, frozen eggs and tung oil, and about 70% of the imports of shelled walnuts and sesame seed.

MEDICINE

Sulfa for Undulant Fever

Whole blood, that contains new antibodies, is given patients. Theory is that the drug fights disease by increasing the action of the antibodies.

➤ **NEW TREATMENT** which may save the lives or relieve the suffering of victims of undulant fever was described to the Fourth International Congress for Microbiology by an American scientist.

The treatment is a new use of the famous sulfa drugs. Dr. I. Forest Huddleson, Michigan State College bacteriologist, told the Congress that four persons near death with high fever from the disease had recovered after receiving the new treatment.

Dr. Huddleson injects blood into the system of the patient and then administers small doses of sulfadiazine for one week. He believes the principle of the treatment may be used to save the lives of sufferers of many other infectious diseases.

Undulant fever is also called Malta fever, brucellosis and Mediterranean fever. Human victims get the disease from cows, goats or pigs. It may come from drinking the unpasteurized milk of cows which have the disease. Persons with undulant fever are subject to re-

curing attacks which cause considerable disability though the disease is seldom fatal.

Earlier experiments with sulfa drugs against undulant fever were unsuccessful, and there was little hope of curing the patient unless he was treated within 10 days after contacting the disease.

Dr. Huddleson explained his theory that the drug fights disease by increasing the action of antibodies in the system of the victim. When the patient has had the fever for several weeks, the antibodies become inactive from the disease and are not aided by the drug. This, he said, accounted for the lack of success in treating undulant fever with sulfa drugs in early experiments.

Injecting whole blood into the patient supplies fresh antibodies to fight the disease. Then Dr. Huddleson administers sulfadiazine to the undulant fever sufferer.

He hopes to develop a compound in which physicians can give undulant fever victims both the antibodies and the drug without using whole blood.

Science News Letter, August 9, 1947

whole strongly and permanently bonded with a resin. The use of plywood in planes is not new, but it has been mostly in light aircraft.

The Hughes Aircraft Company, builder of the Hercules, was organized in 1936 by Howard Hughes to develop a racing plane with which he had already established a world record. It was a modified version of his original plane with which he made a non-stop flight in 1938 across the country in seven hours and 28 minutes.

In 1939, the company started development work with plastic materials for plywood airplane construction. In 1942, Mr. Hughes joined with Henry J. Kaiser to build three experimental cargo flying boats for the U. S. government. They were to be eight-engine planes of original design, made of wood because of a scarcity of suitable metals. The order was cancelled in 1944, partly because of delays in starting construction and partly because metals for construction were then available.

The Hughes company produced a high-speed, twin-engine experimental plane in 1944. From this was developed a military reconnaissance monoplane which carried the Army designation XF-11.

Science News Letter, August 9, 1947

CHEMISTRY

New Insecticide Claimed Safe for Vegetable Use

➤ **CORN-ON-THE-COB** without worms is the promise of a new insecticide now undergoing field tests. Rhothane is the trade-name of the new product, which is a close chemical relative of DDT but claimed to be so much less toxic to human beings and farm animals that it is safe to put on vegetables intended for table use.

U. S. Department of Agriculture entomologists state that the new insecticide differs from DDT in having one atom less of chlorine. DDT is dichlorodiphenyl-trichloro-ethane. Rhothane is dichloro-diphenyl-dichloro-ethane. That is, its initials are DDD instead of DDT.

Another claim advanced on behalf of Rhothane by Rohm and Haas Company, its sole manufacturers, is that it is less toxic to fish, so that it may meet the wishes of wildlife administrators for a material that can be used against mosquito larvae without harming the fish that swim in the same waters.

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AERONAUTICS

Giant Plywood Seaplane

➤ **THE GIANT** Hughes Hercules flying boat, the building of which with government money is now raising questions on the part of Congressmen, is a seaplane with some four times the estimated carrying capacity of the war-tested veteran Martin Mars. Its actual capacity is not known because the airplane, while reported to be afloat on the water, has not yet even been given taxi-tests on the water's surface.

The surface tests will be given soon, it is said, but only after engineers have completed making thorough tests with various testing instruments of its component parts, both by themselves and as a part of a whole. These tests have largely to do with the proper functioning of the parts under all conditions and particularly under the stresses to which they will be subjected in use. No

promises have as yet been made when surface tests will begin, or when a try-out will be attempted in the air. It is now about two years behind the date on which it was to have been completed.

This Hughes flying boat has a wingspread of 320 feet, and a 220-foot-long hull. The Martin Mars was 200 feet in wingspread and about 117 feet in overall length. The newer Mars, JRM in the Navy, is about the same size, but has certain refinements. The original Mars on one trip carried 35,000 pounds of cargo.

Size alone is not the only point of interest in the eight-engine Hercules. It is of plywood construction rather than of the usual light metals such as aluminum and aluminum alloys. This plywood is built-up panels and beams of very thin sheets of wood with each alternate sheet laid crosswise, and the

ENGINEERING

Taming Missouri River

Work that will take a generation to complete has begun. Four dams are being constructed and will give some flood control benefits by 1949.

➤ THE JOB of taming the Missouri river, under the flood control program recently commended by the President, has already begun. Four dams on tributaries are now being constructed by the U. S. Reclamation Service. The gigantic main-stream dam at Fort Peck, Mont., is practically completed, and work has begun on another gigantic dam, the Garrison, in North Dakota.

All dams on the Missouri tributaries will be constructed by the Reclamation Service under present plans and those on the river itself by the Army Corps of Engineers. The ambitious program may require a generation to complete, but some flood control benefits will be obtained by 1949. Irrigation benefits and hydroelectric power will soon follow.

In the Reclamation Service program, a total of 93 dams is planned. The Bureau has picked out 46 as available for immediate construction when funds are appropriated. These 46 will do much to control floods on the Missouri, and they fit into the integrated water-control pattern. The four under construction are the Kortess and the Boysen dams in Wyoming, Angostura in South Dakota, and the Enders in Nebraska.

The authorized Missouri control program, known as the Pick-Sloan plan, calls for expenditures of some \$2,000,000,000, and would be for the particular benefit of ten states in the Missouri basin, but in addition would have some effect on flooding in the lower Mississippi Valley.

The Missouri basin represents about one-sixth of the total area of the United States. The Missouri river itself is nearly 2,500 miles long. It has hundreds of tributaries between western Montana and the point where it empties into the Mississippi near St. Louis. Most important are the Yellowstone, Niobrara, Platte, Kansas and Osage.

The area of the upper basin, where many dams on tributaries are proposed, is agricultural and grazing territory which needs irrigation for dependable crops. The lower basin needs protection against floods. The proposed works, in addition to flood control and providing

irrigation water, will develop much electrical energy. This is needed for modern farming and by the urban industries of the basin. In fact, a plentiful supply of electric power might attract many industries to the region, some of which would use its natural mineral resources.

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ASTRONOMY

Many "Shooting Stars" Can Be Seen in August

➤ AUGUST is the month of "shooting stars," or meteors.

This is because, during the first three weeks of this month, the earth will be crossing the path of the Perseid meteors. You do not have to be an astronomer to enjoy the nightly showers of these bits of cosmic dust which each year invade the earth's atmosphere in August.

On any clear dark night, you can normally see an average of one or two shooting stars an hour. But during the next two weeks, you will be able to see many more.

High point in the number of Perseid meteors will come the night of Aug. 12, with many shooting stars each night from the ninth through the thirteenth.

Best time to see the Perseids is between midnight and dawn. They will seem to be coming from the constellation, Perseus, the champion, which rises in the northeast on August nights.

What we call shooting stars are not stars, but bits of cosmic dust associated with comets. These meteors, as they are more properly called, are usually burned and vaporized by friction as they enter the earth's atmosphere. A few, however, have reached the surface of the earth, and these are known as meteorites.

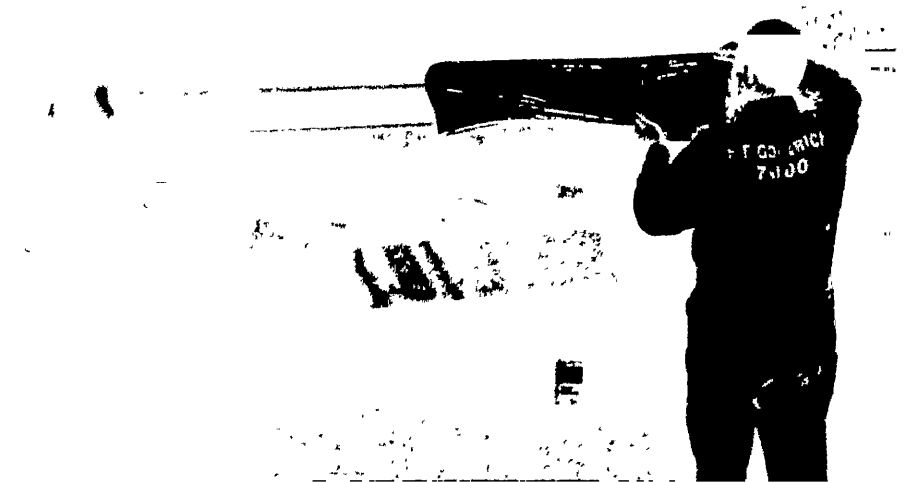
Although the Perseids seem to radiate from one point in the sky, they will be seen all over the early August sky. Some of the brightest of the Perseids will be brighter than the largest of the planets, Jupiter.

The path through which the Perseids move is the same as that of Tuttle's comet, last seen in 1862, and the meteors which you can see may be the remains of the comet.

If you want to help astronomers count the shooting stars from this month's showers, make a record of the number of meteors you see and when you observed them. Then send your count to Dr. Charles P. Olivier, director of the Flower Observatory of the University of Pennsylvania and president of the American Meteor Society, at Upper Darby, Pa.

Science News Letter, August 9, 1947

When Germany owned the Pacific Truk islands, large numbers of *coconut palms* were brought in and planted and are now the principal tree species of the area.



FILM STRIPPING—A thin film is applied on airplane de-icers to protect the rubber from hot weather. At the end of the season it can be stripped off as shown.

PHYSICS

Humidity Controlled In Electric Refrigerator

➤ AN ELECTRIC refrigerator with accurately controlled humidity is the claim advanced by Wilson P. Boothroyd of Philadelphia for patent 2,424,735, which he has assigned to the Philco Corporation. Control is effected by means of what he calls a "humigrnd". This is a plate of glass or other non-conducting material having on it a grid of thin platinum ribbon. Resistance to flow of an electric current rises when the humidity goes up, falls when humidity decreases. These changes can be used to turn on and off the necessary humidity control mechanism

Science News Letter, August 9, 1947

AERONAUTICS

Helicopters Now Deliver And Collect Mail Sacks

➤ HELICOPTERS will soon be picking up mail sacks at the Los Angeles airport, delivering them to the central post office and carrying mail from the central office to other post offices with a range of 50 miles. They also will pick up mail at the suburban offices.

Los Angeles Airways, Inc., the first company to be given a government Civil Aeronautics Board certificate for helicopter mail and property service, will have three years in which to demonstrate the value of this new type of mail handling. The company will serve 30 post offices, traveling over three routes that total some 200 miles in length. Four Sikorsky S-51's are to be used. They will make three daily runs over their routes, greatly cutting down the present time for truck deliveries and collections, it is expected. Service will begin this fall.

Science News Letter, August 9, 1947

RADAR

Altimeters To Aid Safety In Commercial Transports

➤ WINTER bad-weather flying will be safer this year in commercial transports now being equipped with radar altimeters. These permit a pilot to know just how high he is above the ground.

One company, United Air Lines, has just revealed that it has purchased 200 of these instruments for installation in mainliners and that they will be in use late this fall.

The radar altimeter is an electronic instrument that indicates to a pilot his height above the surface of the earth below, or the distance to mountain obstacles ahead. Its effective range is approximately 8,000 feet, both below and ahead of the plane.

The instrument sends out a radio signal similar to the pulse emitted by radar devices. It is reflected back by the earth, and the elapsed time of its travel from the plane to the ground and return is measured and converted automatically into feet on an indicator on the plane's instrument panel.

The instrument can be pre-set to give a warning light at any altitude of less than 1,000 feet. In fact, it has three lights: a green one shows that the plane is well above the pre-set elevation, an amber light shows when the plane is approaching the pre-set altitude, and a red light indicates that the plane is at or below the safe level.

Planes will continue to use standard aneroid barometers. These indicate height above sea level, not the height above the underlying terrain. The two types of altimeters will be used in conjunction with each other.

Science News Letter, August 9, 1947

CHEMISTRY

Ammonium Nitrate Needs Careful Handling to Ship

➤ THE AMMONIUM nitrate explosion of a cargo ship in Brest Harbor, France, following so closely the similar Texas City disaster, will probably upset the idea of some explosion experts that additional regulations to be followed in handling and shipping this important chemical are unnecessary. They refer to pure ammonium nitrate, uncontaminated with organic material.

Ammonium nitrate, in peacetime, is used largely in fertilizers. Now it seems it is used both for fertilizers and in explosives. Hundreds of thousands of tons were made during the war in the United States for the government.

Domestic production before the war was only a few thousand tons each year, but much was imported. Now it seems that very much will continue to be made in America because its use in farming has greatly increased. It probably will be a permanent competitor of sodium nitrate and ammonium sulfate for top-dressing and side-dressing crops. Interstate shipments will exceed greatly the quantities shipped in the past. (See SNL, April 26.)

Science News Letter, August 9, 1947

IN SCIENCE

ARCHAEOLOGY

Early Natives Caught Cod 3,500 Years Ago

➤ CODFISH were caught in Massachusetts long before the Colonial "cod-fish aristocracy" built its fortunes on this lusty and profitable fish. Test borings on the Back Bay site of a new skyscraper in Boston have turned up fish weirs that Indians built of stakes and brushwood, estimated to be 3,500 years old. Marks of these early settlers' stone axes can still be seen on the wood.

Science News Letter, August 9, 1947

MISSILES

Proximity Fuze Tested In Bombing Forest Fires

➤ BOMBS triggered by the famous proximity fuze may be used to fight forest fires.

Carrying fire-fighting chemicals, the bombs would be dropped from Army bombers and exploded at the level of tree tops to battle the costly blazes which each fall take a high toll in American forests. Tests bombings of controlled, man-made fires in Montana have been successfully completed, E. F. Horton of the National Bureau of Standards disclosed.

The new attack on forest fires was born a year ago at a meeting of scientists at the Bureau of Standards. Dr. E. U. Condon, director of the Bureau, urged that some of the wartime achievements of the Bureau should be turned to peaceful uses. Harry Diamond of the electronics section, which played a leading role in the development of the proximity fuze, suggested using the fuze against forest fires.

In the Montana experiments, the 165-gallon auxiliary fuel tanks of Army Air Forces P-47's and one-ton general purpose bombs of B-29's were filled with water and dropped over the experimental fires set by the U. S. Forest Service. The fuze exploded the tanks and bombs over the fires, either putting out the fire or wetting the surrounding area.

Millions of dollars worth of precious timber may be saved by bombings on forests in this country if the new attack is carried to forest fires.

Science News Letter, August 9, 1947

E FIELDS

ORDNANCE

Permanent Magnet Gives "Snap" to Trigger Action

➤ **GOOD SHOOTING** with small arms is always faced with a dilemma. The novice is always told not to jerk the trigger but to "squeeze" it. This, however, introduces the mechanically undesirable factor known as "creep." To overcome this and obtain "snap" in rifle or pistol firing mechanism, Lt. Col. J. F. McCaslin of the Army places within the gunstock, just in front of the trigger, a small but strong permanent magnet. A horizontal arm of the trigger, made of a metal only lightly attracted by the magnet, is in contact with it. As the trigger is squeezed, this paramagnetic arm resists just enough so that when it does break free the desired "snap" is imparted to the action.

Rights in Col. McCaslin's patent, No. 2,424,247, are assigned royalty-free to the government.

Science News Letter, August 9, 1947

BACTERIOLOGY

New Machine Kills Germs With "Death Whispers"

➤ **A MACHINE** that makes germ-killing with "death whispers," or supersonic waves, more effective by putting a quaver in them is the subject of U. S. patent 2,424,357, issued to C. B. Horsley of Stamford, Conn.

Supersonic waves, which are like sound waves but come so fast no human ear can hear them, have been known for some 25 years to be effective in killing microscopic life forms. However, they have not been used as widely as they might, partly because there seems to be a critical lethal wavelength for each species—possibly more than one for some species, according to its age or other condition. So Mr. Horsley has undertaken to lay down a barrage of wavelengths by rapid modulation of a basic wavelength over any desired range or rate.

This is accomplished simply by placing a piston facing the vibrating diaphragm in the chamber containing the fluid to be sterilized, and moving this piston rapidly in and out while the diaphragm vibrates. This increases and

decreases the effective wavelengths in accordance with what physicists know as the Doppler effect.

Another machine that produces the same effect with both audible and supersonic waves in air is covered by patent 2,424,375, granted to W. A. Van Allen of Cambridge, Mass. In his machine, the face of the piston becomes a reflector for a "beam" of waves striking it at an angle, and modulates them in the same way.

Both patents are assigned to the Ultrasonic Corporation of Boston.

Science News Letter, August 9, 1947

RADIO

Planes To Use Static-Free Microwave Communication

➤ **U. S. ARMY** planes of the near future will be equipped with static-free radio communication systems, Brig. Gen. F. L. Ankenbrandt of the Army Air Forces told the General Electric Science Forum. This will be accomplished by using the so-called microwaves, better known perhaps as exceedingly short radio waves.

These are transmission waves of ultra-high frequency similar to those used in television. They follow "line-of-sight" paths, so can not be used for long distances except where no obstacles intercept them. Ordinary radio waves follow the curvature of the earth, or are reflected from air strata high above the earth. The great objection to their use is due to static; very-high and ultra-high frequencies are practically static-free.

The installation of very-high frequency communication at all airports under the supervision of the Civil Aeronautics Administration is a definite plan of that organization, and many such installations have already been made. The CAA so-called radio-ranges will also use very high frequency known as VHF for short. These ranges provide the radio "beam" which pilots "ride." The beams, shot from carefully located stations along air routes, are followed by pilots with the assistance of instruments on their airplane panels.

"We are developing a great many devices which show promise of minimizing the effects of noise on our aircraft communication systems," the general stated. "We have found most types of atmospheric noise to be practically nonexistent in the ultra-high frequency or micro-wave region of the radio frequency system."

Science News Letter, August 9, 1947

ENTOMOLOGY

Grasshoppers Get Late Start on Wheat Crop

➤ **GRASSHOPPERS** were held back so effectively by the chilly, rainy spring and early summer weather over the Plains area this year that the bumper crop of wheat is being harvested without their being able to do it any harm. They are showing up in numbers now at the northern end of the Plains. However, state U. S. Department of Agriculture entomologists, it is not planned to attack them with poisoned bran bait until just before time to do the fall seeding for next year's crop.

There is heavy grasshopper infestation in Arizona and parts of California, and in these states poisoned bait is being distributed.

During the war, when all supplies of arsenic were needed for other purposes, sodium fluosilicate was substituted for the arsenicals formerly used in grasshopper baits. This was found so satisfactory that its use is being continued in most places. Arsenic baits are necessary under certain special conditions, such as heavy 'hopper infestation in alfalfa.

Science News Letter, August 9, 1947

CHEMISTRY

Five-Minute Francium Turns into Astatine

➤ **A NEW TWIN** of one of the most recently discovered chemical elements turns into another rare element after existing only five minutes.

Prof. F. A. Paneth of Durham University called the attention of the International Chemical Congress to this new isotope of element 87. This fundamental chemical building block was christened francium only this year by Mlle. Marguerite Perey of the Paris Radium Institute, who first discovered a radioactive isotope of element 87 with a half-life of 21 minutes.

The new isotope of 87 with a half period of five minutes emits alpha particles and changes into the element astatine number 85.

The discovery of the new five-minute francium isotope will be reported in a scientific paper by Drs. A. C. English, T. E. Crawshaw and their collaborators to be sent to the Physical Review, U. S. scientific journal.

Science News Letter, August 9, 1947

ENGINEERING

New Pleasure in Rail Travel

Better view, dust-free air and reduced noise are among the new improved features of rail cars. Roadbeds and safety are first concern of officials.

By A. C. MONAHAN

➤ RAILROAD tracks in America are far from being headed for the scrap pile. Railroads feel keenly the competition from airliners, buses, trucks and private cars. They are meeting it with "service." And this does not mean merely what one road advertises as "service with a smile."

It is railroad service, all designed to assure speed, safety and passenger comfort. It includes better roadbeds, signaling systems and rolling stock. It also includes more dependable train schedules both for passengers and for freight. It provides ways to keep passengers happy, ranging from constant radio programs and motion pictures to dancing facilities and glass-covered domes on car tops for those who want to enjoy the scenery along the route.

Safety First

Passenger comfort and pleasure is not the most important item in the present railroad improvements or in those of the near future. But it is the item of popular appeal. Railroad passengers assume that the tracks and trucks on which they ride are always in condition. They assume that railroad management will take full care of proper train operation.

They are therefore concerned with smooth-riding, freedom from dust and noise, fresh air and a comfortable temperature, summer and winter. Then they want easy chairs in which to sit, chairs in which they can sleep if they wish. They want plenty of room, good food, and comfortable beds if they are in sleeping cars.

Railroad officials are concerned first with the things that make rail transportation possible, reliable and safe. These have to do with such things as the track, locomotives, cars and operational procedures, including a proper signalling and communication system. These are items the passenger does not see, but there would be no comfort, or safety, for passengers without them.

Smooth riding depends upon the roadbed, the car springs, softening pads and shock absorbers under the cars. Sway is lessened with cars with a low center of gravity. Aluminum bodies make a low center of gravity possible, and they lessen the weight the locomotive has to pull.

Noise is diminished by properly shaped wheel flanges and track rails, also by shock absorbers. Important, however, is the elimination of the constant clank-clank of wheel passing over rail joints. Welded joints between abutting rails, replacing the ordinary bolted plate connections, get rid of most of this clanking. Elasticity in ballast under rails and ties helps decrease noise, and double windows go a long way in keeping outside noises out.

Air-conditioning is an important item in passenger comfort. To be satisfactory the system must deliver fresh air, freed from dust, soot and engine gases, which is heated or cooled as required. Proper

distribution within a car is essential. No longer is it considered satisfactory to admit conditioned air at one end and remove fouled air from the other. Air-delivery ducts, and bad-air exhausts, must be placed throughout the length of the car, and heated air must be available on the floor to keep the passengers' feet warm.

All these things are planned for trains of tomorrow, and many of them are already in use in new postwar trains. Their inclusion, together with other modern essential structural improvements, may double the cost over the old type car but, to meet the competition, railroads will supply them as rapidly as possible and rely on increased traffic to repay the indebtedness they must incur.

Tomorrow's Trains

As a sample of what trains of tomorrow will be, a new train of today may be cited. It is the so-called Empire Builder. Five such trains were put in service in the late winter this year by the Great Northern Railway and the Burlington Lines for fast transportation between Chicago and Seattle.

The Empire Builder, drawn by a 4,000-horsepower diesel locomotive, includes 12 cars. They are a mail-baggage car, four coaches, a coffee shop, a diner, four sleepers, and a combination sleeper-lounge-observation car.

One of the coaches is a 60-passenger type. The other three are of the new "Day-Nite" design, and have chaise-longue reclining seats. They provide maximum riding comfort during the day, and at night the passenger obtains full-length sleeping comfort by reclining his seat and pulling down a large upholstered leg rest which is built flush into the back of the seat ahead.

For Pullman sleeping accommodations, passengers may choose an open section, a duplex-roomette, bedroom or a drawing room. Duplex-roomettes are relatively new. By an ingenious up-and-down staggering of this single-occupancy room, to conserve space, engineers have provided private room accommodations at only slightly more than the cost of a lower berth.

The Union Pacific is already operating similar trains between Chicago and Portland, Ore. Like other new trains, its cars are of the latest type of con-



SAFER TRIPS—Behind the scenes, many new devices are working for your protection, such as the walkie-talkie which keeps train and yard personnel in constant communication.

struction, using alloy material of high tensile strength, thus reducing the weight of cars as compared with older types. All cars are equipped with high-speed, electro-pneumatic brakes and roller bearings, and with air-conditioning.

General Motors now has a traveling train which it is exhibiting at various cities throughout the United States that it calls the "Train of Tomorrow." General Motors does not build cars, but it builds much of the equipment that is put into them, particularly electrical and air-conditioning units. It calls the new trains an experimental project to try out ideas for the improvement of railroad travel. It does build many diesel locomotives for mainline traffic.

In addition to riding comfort, railroad officials know travelers enjoy viewing the country-side through which they are passing. Particularly they enjoy expansive farm lands and mountain valleys. For that reason, observation cars have been added to trains, and bigger and better windows provided in coaches. G. M. goes a long step ahead—with an "Astra Dome" on its cars.

The Astra Dome car has a double deck in its center section. Passengers on the upper deck ride with their heads above the ordinary roof, protected by a special transparent covering. Their elevated position gives them a superior viewing advantage. The seats give them the same comfort as those below.

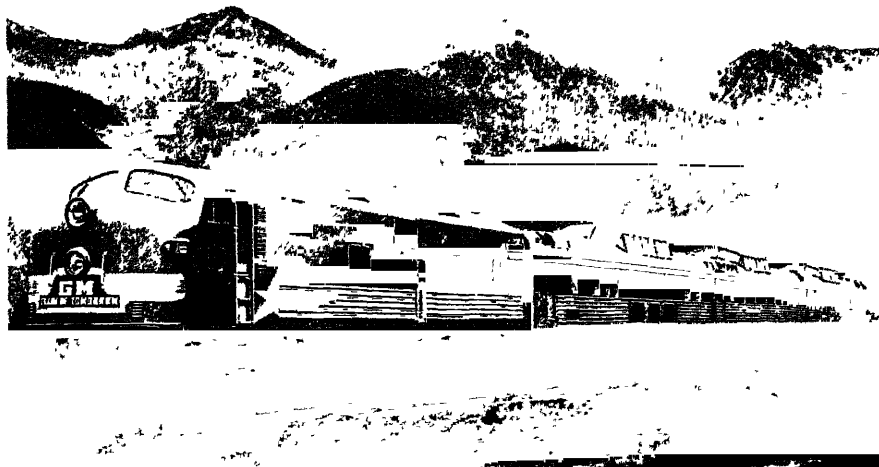
Above Roof Level

The dome itself is two feet above the car roof level. It is 30 feet long and 10 feet wide. There are 24 seats for passengers in the domes on sleeping, chair and lounging cars, and tables and seats for 18 on dining cars.

Its glass covering is double. The outer panel is polished plate glass containing special ingredients to absorb the heat rays of the sun. It is especially tinted to cut the sun glare. It has been heat-treated to give it perhaps four times the strength of ordinary plate glass.

The inner pane of the double glass covering is similar to laminated automotive safety glass. It is made up of two layers of plate glass with a layer of a transparent plastic between. The plastic used is thicker and tougher than used in automobile glass, and is tinted to give it glare-reducing properties.

Present and coming improvements in railroading were emphasized at the recent ten million dollar railroad exhibit at Atlantic City. Two floors of a conven-



ASTRO DOME—If you take your vacation trip on one of today's new trains, you can have a much better opportunity to see such gorgeous scenery.

tion hall and half a freight yard were filled with equipment, including new locomotives, aluminum cars and refrigerators, ranging from railroad iron for tracks to paper drinking cups for passengers.

Many trains in America are now in constant touch by radio with the train dispatcher along their routes, and engineers and conductors on the same train are in touch with each other. Switch engines in freight yards are also controlled by radiophone. A system, installed by the Farnsworth Television and Radio Corporation of Fort Wayne, Ind., has been in operation over a year in the Potomac Yard, across the river from Washington, D. C. This is one of the world's three largest classification yards. All switch engines making up great freight trains receive orders direct from the control tower by telephone of the radiophonic type.

On the "Cincinnatian," a Baltimore and Ohio new train between Baltimore and Cincinnati, and on other trains as well, loud-speaker systems call all station stops for the benefit of passengers, and are used by dining car stewards to announce "Dinner is now being served." Between times they bring radio programs to the passengers.

Smokeless locomotives will bring comfort to passengers and to the countryside as well. New developments for the ordinary coalburner makes smoke unnecessary. Giant electric and diesel locomotives coming almost daily into use belch no smoke. Steam turbine and gas turbine locomotives, which may soon become common, are smokeless. Then there is the new coal-burning gas tur-

bine which will be ready for the rails in 1948. Its fuel is a highly pulverized coal which burns under conditions where no smoke is produced.

Science News Letter, August 9, 1947

MARINE BIOLOGY

Male Limpets Change Sex To Grow into Motherhood

➤ **SEX LIFE** among the limpets must be just a bit complicated. Like their distant relatives the oysters, as well as other mollusks, limpets change sexes during their lifetime. With them, sex seems to be a matter of size. Dr. G. Bacci of the Zoological Station of Naples reports in *Nature* (July 19), that the smaller, and presumably younger, limpets are usually males. As they gain size they apparently become fitted for the burdens of motherhood, and change into females.

Limpets are small mollusks protected by single flattish cone-shaped shells that look like miniature volcanoes. They cling so tightly to tideline rocks that to "stick like a limpet" has become proverbial. During the war, the name limpet was given to a highly successful sabotage device consisting of an explosive charge with time-fuze, attached to a magnetized base. Shoved against the side of a ship below the waterline by a quiet swimmer, this device would cling to the steel hull until it exploded. Limpets of this dangerous variety are still being used by terrorists against British vessels in the troubled waters of Palestine.

Science News Letter, August 9, 1947

Do You Know?

White has the highest light reflection value of any paint.

Theater stage electric *lighting* was first tried 100 years ago.

To produce one ear of *corn*, 50 gallons of water are required, an agricultural scientist recently stated.

Home gardeners can make successive plantings of many *vegetables* throughout the summer.

To make the best *cattle feed*, alfalfa is cut before it is more than half in bloom.

Six queen *bees*, recently flown from California to Australia for experimental breeding, were valued at \$100 each

A total of 3,970 *superfortresses*, the B-29 plane that acquired fame against the Japs, were constructed during or immediately following the war.



Photo courtesy Univ of N Carolina

Equipment for Teaching Electrolytic Conductivity

A simple bridge setup for instruction consists of Students Slidewire, Resistance Box, 1000-cycle Hummer, Telephone Headset and Conductivity Cell. Slidewire, used as ratio arms of the bridge, due to its 30 ohms resistance plus two 135-ohm end coils, facilitates quick, easy operation and good reproduction of results. See Catalog EN-95, sent on request.

LEEDS & NORTHROP COMPANY, 4777 STATION AVE., PHILA., PA.
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 TELEPHONE HEADSETS TELETYPE AUTOMATIC CONTROLS HEAT TREATING FURNACES
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OPTICS

Man Must Learn To "See"

➤ A PERSON born blind who later gains his vision does not have the world of sight suddenly burst upon him in full glory. Even the sight of food means nothing to him. He must learn to see.

What happens when the eyes first look at the world has been observed in an experiment on chimpanzees conducted at the Yerkes Laboratories of Primate Biology by Dr Austin H. Riesen.

Baby chimpanzees were raised in darkness until they were 16 months old. By that time they were able to sit and reach and run around in a way about like that of a two-year-old human child. Naturally they had never used their eyes.

Then these babies were brought into the light for their first look. They were blind!

They would turn their heads toward a light. Their eye pupils would dilate or contract with changes in light intensity. They would be startled by sudden changes in illumination.

But aside from these responses to light, they saw nothing. Even if a chimp playmate hit one of them in the face with something, they did not blink or show any sign of avoidance until the object actually touched the skin. Then they jumped, startled.

Like human babies, the chimps would put the nursing bottle in the mouth eagerly as soon as it touched the arm, hand or face. But if it was held before them, they gave not a single sign of recognition. It was not until one of them had been in the light for 11 days that she puckered up her lips on sight of the bottle. Not for 16 days—48 meals—did she learn to reach for it.

Study of humans born blind and later given their sight by removal of cataracts showed that they, too, have great difficulty learning to "see."

The prompt visual learning so characteristic of adult humans and apes is not, therefore, an inborn capacity, but requires a long apprenticeship in the use of the eyes. Dr. Riesen concludes in his report of the experiment in *Science*, (Aug. 1).

Lower in the animal scale this period of apprenticeship is much shorter, he found. A baby chick uses his eyes just as soon as he comes out of the shell. His efficiency is further improved after the practice given him by a dozen pecks. Rats, brought up in darkness, are at

first unable to use their eyes but can learn within 15 minutes to jump in response to what they see. After an hour they act just like normally reared animals.

Science News Letter, August 9, 1947

NUTRITION

UN Plans Food Shipments To Needy Children Soon

➤ FIRST SHIPMENTS of food to Europe's underfed children and expectant and nursing mothers from the United Nations International Children's Emergency Fund are expected to be made this month, it was reported at the meeting of the Committee on Child Nutrition.

Medicine and clothes for needy mothers and children in Europe are also being planned as the ICEF carries on now-terminated work of the United Nations Rehabilitation and Relief Administration.

Austria, Greece and Poland were mentioned at the sessions as the countries likely to receive the first shipments of food. In all, a dozen nations and 20,000,000 children in war-torn areas are expected to be covered by the emergency program.

Top priority food needs of these children, as outlined by nutritional experts of several nations at the conference, are animal proteins, calcium and vitamins. Supplies of whole milk for European children less than one year old, and skim milk for older youngsters were urged as basic needs.

First part of the food program is being financed from a fund of more than half a million dollars which the group inherited from UNRRA. Most of this sum is going into dried milk. U. S. contribution of \$40,000,000 for the ICEF has been authorized by Congress and the first payment of \$15,000,000 will be made soon.

Norway already has donated 1,000 barrels of vitamin-rich cod liver oil to the Fund.

By the end of the year, ICEF hopes to have spent \$70,000,000 in improving the diets of five to six million European children.

Science News Letter, August 9, 1947

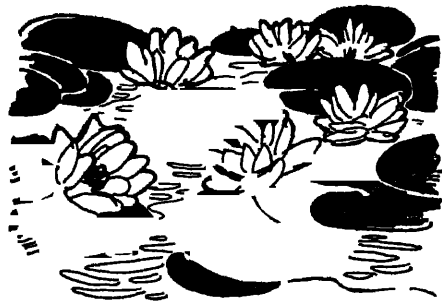


if gasoline were sold in sacks...

it would be easy to stencil everything you'd like to know about the ingredients it contained right on the sack. However, gasoline is generally delivered direct to your gas tank, sight unseen. Oil companies can't label each gallon. That's why they put the familiar yellow-and-black "Ethyl" emblem on their pumps to show that they have improved their best gasoline with "Ethyl" antiknock compound. This famous ingredient, which improves engine power and performance, is made by the Ethyl Corporation, Chrysler Building, New York 17, New York.

look for the **ETHYL** trade-mark





Tame Them Young!

➤ WE ARE SO USED to thinking of the width of rivers in terms of maxima that the idea comes hard, that somewhere in their upper courses are places where a man could cross them with one stride. True, official geography says that the Mississippi has its source in Lake Itasca, Minn., that the Ohio is formed by the confluence of the Monongahela and the Alleghany at Pittsburgh, and that the Missouri comes into being by the union of three rivers, Jefferson, Madison and Galatin. But on the other side of the lake, and at the upper ends of self-immolating rivers that lose their identities in that of the larger streams, there are certainly those same dwindlings down to mere brooks.

A few rivers are born big; they burst forth from underground drainage like Minerva from the forehead of Jupiter. But they are exceptions; the normal thing is for a river to start small and grow large, as babies grow into men. This

analogy fails at one point, however; rivers are simultaneously infants in one place and giants in another; and the giant is a giant because so many infants feed it.

This long prelude leads up to a very practical point. The giant, as we have had tragic occasion to know this year, becomes unruly at times and wreaks terrible destruction. And that is because its thousands of infant feeders start gorging it with water they have received from the clouds at the same time, or nearly the same time.

With only one of two notable exceptions, we human beings who are all too often the victims of streams that should be our servants think of taming the raging giant only in straitjacket terms. We build levees along the banks. The more the giant rages, the higher we raise the earthen walls, until finally comes a night of terror when the giant's strength becomes too great for even the

thickest, stoutest straitjacket. Then we pay for our folly, always with our wealth, often with our lives.

There are a few prophets abroad in the land who see clearly how the giant can be kept in more or less orderly mood all the time. This is not to be done by any improvements in direct restraint but rather by an indirect restraint consisting in taming the little feeder streams.

This can be accomplished in many different ways, all of which can be employed simultaneously. We can build thousands of small, cheap check-dams where the rivers are less than three feet wide. We can terrace and contour-plow sloping fields, putting the brakes on runoff water. We can re-sod and reforest denuded areas. Every pint of water held back at headwaters means less trouble for folks farther downstream when heavy rains do come.

Science News Letter, August 9, 1947

BALLISTICS

N.Y. in Nazi Bomb Plan

➤ THE GERMANS planned a bomb to cross the Atlantic and blast New York. It was a rocket to be started on its long journey by another rocket which detached itself when its job was done.

This was revealed by Brig. Gen. William L. Richardson of the U. S. Army Air Forces.

General Richardson, chief of the AAF Guided Missiles and Air Defense Division, spoke as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

The Germans, he said, developed several rockets known as the "A" series. The V-2, used against London, was one of these and although it was the only one of this series to be used operationally in the last war, it is not hard to visualize what might have been in store for the Allies had the Germans been given sufficient time to complete developments.

Each of the "A" series was developed primarily for research with the exception of A-4, later known as the V-2. The A-10 was the end result toward which this whole program was directed. This is the weapon which the Germans expected to use in bombing New York.

The A-10 was described by him as a booster rocket placed behind the A-9 giving it two-step cooperation to secure ranges of 3,000 miles. The A-9 was

much like the A-4, more familiarly called the V-2, with wings added to give increased range and using acid as an oxidizer in its fuel.

The A-10 was never actually constructed. However, all design studies and computations had been completed, and it appears that it could have been built and served its purpose provided the Germans had been given another year of development and production.

The total weight of the A-10 was to have been 190,000 pounds, of which 140,000 was fuel. The weapon was nearly 12 feet in diameter and 25 feet long. The 29,000-pound A-9 was to have been accelerated to a speed of 2,500 miles an hour by the use of the A-10 as a launching rocket, which detached itself and would drop free after serving its purpose.

It is the A-9 that would reach the target. Its rocket motor would be turned on when the A-10 dropped. This would increase its speed to about 6,000 miles an hour. It would have carried a warhead of about 2,000 pounds. This is a payload of only 1% of the starting weight of the weapon, but there is evidence to believe, he stated that the Germans intended to utilize an atomic warhead which would have made this weapon a very serious menace.

Science News Letter, August 9, 1947

YOUR

HAIR

AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as:

Dandruff — gray hair — thinning hair — care of the scalp — baldness — abnormal types of hair — excessive oiliness — brittle dryness — hair falling out — infection — parasites — hair hygiene, etc., etc.

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BIRDS OF MALAYSIA—Jean Delacout—*Macmillan*, 382 p., illus., \$5. A practical handbook of birds inhabiting Malaysia for those interested in birds but not having special technical knowledge.

CAREERS FOR NURSES—Dorothy Deming—*McGraw-Hill*, 358 p., illus., \$3.50. A guide for graduate nurses, this text discusses 15 branches of special nursing with job description written by a nurse active in that specialty; it should help all students choose wisely in their profession.

CATALOGUE OF NORTH AMERICAN BEETLES OF THE FAMILY CLERIDAE—Albert B. Wolcott—*Chicago Nat. Hist. Museum, Fieldiana: Zoology*, Vol. 32, No. 2, 105 p., paper, 75 cents. Designed for the purpose of informing those concerned with North American Cleridae of some necessary changes in nomenclature and systematics.

THE GEOGRAPHICAL NAMES OF ANTARCTICA—*Dept. of the Interior, U. S. Board on Geographical Names, Special Pub. No. 86*, 253 p., free. The result of most careful study by the board and examination of all available material.

LESSONS IN ARC WELDING—*Lincoln Elec. Co.*, 3rd ed., 152 p., illus., 50 cents in U. S. A., 75 cents elsewhere. Complete and thorough instruction in all phases of arc welding for both new and experienced welders.

MATHEMATICS AS A CULTURE CLUE—Cassius Jackson Keyser—*Scripta Mathematica*, Vol. 1, 277 p., \$3.75. Essays develop the nature of mathematics, mathematical applications, and the bearings of mathematics.

MEDICAL ADDENDA: Related Essays on Medicine and the Changing Order—*Commonwealth Fund*, 156 p., \$1.75. Further development of the trends underlying the practice of medicine reported by the New York Academy of Medicine Committee on Medicine and the Changing Order; psychosomatic medicine, medical social work, psychiatric social work, rehabilitation and convalescence, and chronic diseases.

METHODS OF VITAMIN ASSAY—Assn. of Vitamin Chemists—*Interscience*, 189 p., \$3.50. This manual for the analyst includes only those methods which have been tried on a variety of materials by several committee members.

MUSCULAR CONTRACTION—Sandow, et al.—*N. Y. Academy of Science, Annals*, Vol. XLVII, Art. 6, pp. 665-930, paper, \$3. A discussion of contractile muscle fiber, dealing with dynamics, ultrastructure, chemistry, and mechano-chemical coupling.

PROCEEDINGS OF THE FIRST CANADIAN MATHEMATICAL CONGRESS—Montreal, 1945—*Univ. of Toronto*, 367 p., \$3.75. Contains discussions on secondary school mathematics, statistics, engineering mathematics, and research and graduate work and emphasizes the need for cooperation

among mathematicians for the exchange of ideas.

THE PROCEEDINGS OF THE THIRD PSYCHOTHERAPY COUNCIL—*Inst. for Psychoanalysis*, 176 p., \$2. This two-day council discusses "A Case of Peptic Ulcer", "A Case of Migraine", and "The Psychiatric Out-Patient Clinic of the Future".

STATISTICAL ANALYSIS IN BIOLOGY—K. Mather—*Interscience*, 2nd ed. rev., 267 p., \$5. Designed to help the biologist appreciate the potentialities of statistics in the interpretation of data, it shows the scope of various methods and their interrelation.

STUDIES ON CARBOHYDRATE AND FAT METABOLISM WITH SPECIAL REFERENCE TO THE PIGEON—Oscar Riddle and Associate—*Carnegie Inst. of Wash.*, Publication 569, 128 p., paper, \$1.85, cloth, \$2.25. Information on the physiology of the pigeon and the relatively few observed differences in mechanisms for carbohydrate and fat metabolism in birds and mammals.

TRAIN YOUR HEARING—Mary Wood Whitehurst—*Volta Bureau*, 90 p., \$3. An outlined method of self-training for those wearing hearing aids to help them re-educate their residual hearing. Although emphasizing the fact that personal teacher contacts are most desirable in all rehabilitation work, the author recognizes that this is not always possible and writes to help the numerous hard of hearing who want to help themselves.

THE WATER-SOLUBLE GUMS—C. L. Mantell—*Rembold*, 279 p., illus., \$6. A coordination and clarification of information in gum technology to bridge the gap between art and science in this field.

WORKING WITH ALUMINUM—Douglas B. Hobbs—*Bruce*, 126 p., illus., \$2.50. For the instructor, student, and home craftsman, this manual contains 25 useful projects described in detail.

Science News Letter, August 9, 1947

ENGINEERING

Super-Locomotive Planned Has Two Turbine Engines

➤ RAILROADS, seeking near-airplane speeds and power for ever-increasing loads, are trying turbine-powered locomotives. Such an engine, delivering 9,000 horsepower to 16 drive wheels, is the subject of newly-issued U. S. patent 2,424,676, assigned by Frank L. Alben of Pittsburgh to the Westinghouse Electric Corporation.

All told, the monster has 24 wheels; the eight unpowered ones are mounted on two four-wheel guide trucks, at the forward end and under the middle of the locomotive. There are two turbines, with reducing gears to the drive shaft. Trans-

mission is entirely mechanical. Controls are either mechanical or hydraulic.

The design, the inventor points out, permits the distribution of weight over practically the entire length of the engine. Use of multiple small driving wheels makes possible development of high speeds with minimum wear on rails.

Science News Letter, August 9, 1947

PHYSICS

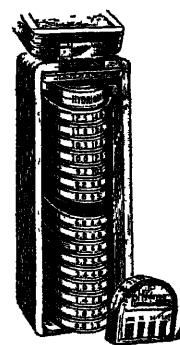
Compact Electron Microscope

➤ A MORE COMPACT type of electron microscope, which uses electrostatic fields instead of the more commonly used magnets for focussing its electron beam, is the invention offered by two General Electric Company physicists, Dr. Charles H. Bachman and Simon Ramo, for a series of four patents, 2,424,788 through 2,424,791. An outstanding advantage claimed for the new design is that the vacuum chamber is small, thereby reducing the time needed for evacuating between changes of specimens. Patent rights are assigned to the employing corporation.

Science News Letter, August 9, 1947

19

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⊗ **VELVET-LIKE** soft finish, applicable at home to surfaces of wood, plastic, metal, paper or cloth, consists of extremely short rayon fibers driven by a spray gun into a coating of a special adhesive. The force of the spray causes one end of each fiber to penetrate the glue, the rest of the fiber standing erect.

Science News Letter, August 9, 1947

⊗ **TUBELESS TIRES** for automobiles, now undergoing all known tire tests, will be available soon. The new tire, with rayon cord construction, is said to combine the safety feature of puncture-sealing inner tubes with improved riding qualities.

Science News Letter, August 9, 1947

⊗ **MINIATURE** toy racer resembles the full-sized automobile in beauty and design. It has a streamlined body of plastic construction, rubber-tired wheels, and a manually wound spring motor, which can run it over 150 feet at 15 miles per hour on one winding.

Science News Letter, August 9, 1947

⊗ **DIAMOND-TIPPED** phonograph needles are now available at a relatively reasonable price due to new high-speed methods of grinding and polishing. Their advantage is principally their long life; test tips have been run daily for two years without showing wear.

Science News Letter, August 9, 1947

⊗ **HEARING-AID**, worn but invisible in the ear of the girl in the picture, replaces the ordinary button with a delicately shaped flesh-colored plastic rim which fits snugly into the ear. A slender



transparent tube, behind the ear, carries sound from a tiny receiver hidden in the hair.

Science News Letter, August 9, 1947

⊗ **AIR FILTER** for sleeping and other rooms, an improved electrically operated type, fits on a window-sill and draws the air from the outside. The cabinet-finished radio-size box and its filters remove dust, soot and plant pollen from the air. Extension panels fit it under ordinary sash.

Science News Letter, August 9, 1947

⊗ **CASTER** for trucks used in factories, station platforms and airports have what is called floating hubs to permit smooth movement over roughness. The wheel

has a gap between its rim and axle which keeps it in contact with the ground at all times and ride it over bumps without lifting the load.

Science News Letter, August 9, 1947

⊗ **HOME TOOL** for amateur plumbers tap out a new seat opening in most standard-type faucets, then adds a new brass replacement seat. It is an inexpensive steel device, easy to operate.

Science News Letter, August 9, 1947

⊗ **ODOR CONTROL** of new manufactured products is obtained by use of an odor classification set. This consists of 32 vials, each of which contains a liquid with what might be called a standard distinctive odor. Substances being tested can be compared with the standards by any person with a good sense of smell.

Science News Letter, August 9, 1947

To Keep Up to Date in

CHEMISTRY

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SCIENCE NEWS LETTER



VOL. 52, No. 7

THE WEEKLY SUMMARY OF CURRENT SCIENCE AUG. 16, 1957



A SCIENCE SERVICE PUBLICATION

MEDICINE

Morphine Substitute Made

Synthetic drug is more powerful than morphine and can be manufactured in U. S., thus insuring a supply of a pain-killing drug. It is habit-forming.

➤ HUNDREDS of patients have been relieved of pain during this past year by a new synthetic drug under trial as a substitute for morphine. Your doctor will probably be using it soon.

The new drug is two to four times as potent a pain-killer as morphine. It has the further advantage of being a synthetic chemical. This means it can be manufactured here in the United States.

If there is trouble in Turkey or elsewhere in the East that cuts off our supply of opium, as the last war cut off our supply of quinine, patients with cancer, gallstones and excruciatingly painful diseases of the blood vessels will not have to suffer because of a lack of an effective pain-relieving drug.

Its chief, if not only, disadvantage is that it can be habit-forming, somewhat as morphine is.

The new drug has been known by three different names: amidone, dolophine and 10820. American manufacturers may give it still other names. Its chemical name is a real jaw-breaker: 4-4-diphenyl - 6 - dimethylamino-heptanone-3.

War-Time Product

It was first made during World War II by chemists at the I. G. Farbenindustrie in Germany. Our intelligence officers heard in 1943 that the Germans were working on a synthetic morphine substitute, but they got no further information until after the occupation of Germany. Then, in 1945, an Army Medical Corps team investigating the German drug industry picked it up and brought some back to the United States. Chemists, pharmacologists and other medical scientists started making and studying it.

Their studies were kept pretty hush-hush. All of them were worried about whether the new drug could cause addiction as morphine can. Until they could be sure, they did not want any of it finding its way to the market, legitimate or illicit.

Federal authorities in the Bureau of Narcotics and the Public Health Service were particularly worried. They did not

want to see the history of heroin and demerol repeated.

Heroin is a chemical relative of morphine. When it was first introduced it was supposed not to be habit-forming. It turned out to be the worst of all drugs in this respect and its importation into the United States is now illegal.

Demerol Not from Opium

Demerol, unlike heroin and morphine, is not derived from opium. It is another synthetic chemical which came out of Germany just before the war. It was widely publicized as being without addiction properties. It went on the market without being under control of the narcotic law and doctors began using it. They read accounts of its safety, missed seeing reports casting doubt on this. And a lot of demerol addicts turned up at the Public Health Service Hospital in Lexington, Ky. Popularly known as the "narcotic farm," this is the federal institution for the study and treatment of narcotic drug addiction.

It took a fight and an act of Congress to get demerol under control as an addiction, or habit-forming, drug.

Amidone, like demerol, is not derived from opium. But scientists at the U. S. Public Health Service have found that it is similar to morphine and other opiate drugs in its ability to produce addiction in animals and man.

It gives morphine addicts the same "bang," the same pleasant feeling of exhilaration as morphine itself does. When given over long periods of time physical dependence on the drug developed so that it had to be continued to prevent a characteristic withdrawal illness. But it relieves and prevents the appearance of symptoms of the illness seen after morphine addicts have their drug taken away from them. It may therefore be valuable not only for relieving pain but for treating the withdrawal sickness from morphine.

The Public Health Service authorities consider amidone a useful drug for relief of pain, particularly when a pain-killer has to be given over long periods

of time. But they believe that unless its manufacture and use are controlled, addiction to amidone will become a "serious public health problem."

Some doctors who have been using it have reported that they did not see any signs of addiction to the drug. But this does not mean that the drug cannot cause addiction or a drug habit. In these cases the drug was not used for long enough periods to learn whether or not it would cause addiction. Many of the doctors who have been using it on trial have been chiefly interested in determining its value in relieving pain and in learning whether it had objectionable features such as causing nausea, drowsiness and dizziness, heart symptoms or sensitivity reactions. For the most part, it did not.

The drug can be given by mouth or by hypodermic injection under the skin, into the muscles or into the veins.

Science News Letter, August 16, 1947

CHEMISTRY

First Ipatieff Chemistry Prize Awarded To Dr. Schmerling

➤ FIRST AWARD of the Ipatieff Prize in chemistry has been made to Dr. Louis Schmerling of the Universal Oil Company.

Dr. Vladimir N. Ipatieff, director of the Ipatieff High Pressure and Catalytic Laboratory at Northwestern University, will present the \$3,000 award and a certificate to Dr. Schmerling on Sept. 15 at the American Chemical Society's national meeting in New York. Dr. Schmerling was cited for his work in the chemistry of petroleum and natural gas.

The prize, established by Dr. and Mrs. Ipatieff, will be given every three years to a chemist under 40 years of age for outstanding studies with high pressures or catalysts.

Science News Letter, August 16, 1947

INVENTION

Canvas Holds Body Armor

➤ NOVEL body armor is the subject of patent 2,424,985, issued to Dana C. Howard of the Army's Springfield Armory and licensed royalty-free to the government. It consists of a canvas holder covering the front of the body, with horizontal pockets into which overlapping V-shaped metal plates can be inserted.

Science News Letter, August 16, 1947

California produces 99% of the olives grown in the United States.

GENERAL SCIENCE

Research Support Blocked

Government support of scientific research was postponed for an indeterminable length of time by the veto of the National Science Foundation bill.

By WATSON DAVIS

➤ BY WITHHOLDING approval of the national science foundation bill and preventing it from becoming law, President Truman has postponed full-scale government support of basic scientific research for at least six months, probably for two years and perhaps longer.

The bill, given pocket veto after passage by both houses, was the result of two years of hearings, debate and compromises in congress. For a year earlier at the request of President Roosevelt, a committee headed by Dr. Vannevar Bush, director of the wartime Office of Scientific Research and Development, worked on a plan for peacetime government support of science and brought forth recommendations that did not differ markedly from the provisions of the bill finally passed.

The Bush plan of power vested in part-time scientific board won out over the single, responsible administrator type of organization vigorously favored by President Truman, the then Secretary of Commerce Wallace and the budget bureau. Both the House and Senate voted down the in-line customary type of organization, preferring to make a group of scientists responsible.

Single Administrator Preferred

Polls among representative scientists showed that they favored heavily at the opening of the 80th congress the single administrator with advisory committees. But when Congress decided upon a foundation membership of 24 serving part-time, 99 out of a hundred scientists went along with this provision, confident that this administrative plan would work fairly and effectively. They pointed to the National Advisory Committee for Aeronautics as a good example of a part-time committee that has administered research successfully for the government since World War I.

Scientists in all fields are disappointed that the national foundation bill did not become law. Some of them point out that control of research funds available for grants are left, by default, largely in the hands of the Army, Navy and Air

Force. They admit that military funds have kept in operation research projects of importance generally, not alone to defense. But they want to see research predominantly in civilian hands and the military research bureaus have agreed with them.

Scholarships for young research scientists were authorized in the bill as an aid to filling the depleted ranks of scientific investigators. This is considered one of the most important functions of the foundation, now delayed.

Both political parties are in favor of science, you may be sure, and the few members of congress who opposed the unsigned bill were careful to go on record for science research. While the unsigned bill, S.526, was a Republican majority measure, it had strong Democratic support and was based solidly on previous bills of the 79th congress.

Whether Congress will reconsider the matter of a national science foundation in its pre-election session in January and

enact a bill more to his liking, as President Truman hopes, is problematical. Real hopes for a national science foundation may be unjustified. Scientists confronted by some of the world's greatest and most urgent problems will have to do the job with what they now have. The government reinforcements aren't coming.

Truman's Objections

Excerpts from President Truman's Memorandum of Disapproval:

"I am withholding my approval of S. 526, the National Science Foundation Bill.

"I take this action with deep regret.

"The proposed National Science Foundation would be divorced from control by the people to an extent that implies a distinct lack of faith in democratic processes.

"The Government's expenditures for scientific research and development activities currently amount to hundreds of millions of dollars a year. Under present world conditions, this work is vital to our national welfare and security. We cannot afford to jeopardize it by imposing upon it an organization so likely to prove unworkable.

"Apart from the conflicts and confusion which would result from this complex organization, the bill would



CELESTIAL GLOBE—For armchair astronomers and civilian navigators, this Plexiglas globe presents the heavens in a graphic picture. It is a working model of the universe and can be adjusted to show the position of the stars at any given season or time of day.

— See "The Universe" T. H. Morgan.

violate basic principles which make for responsible government.

"There are other compelling reasons why control over the administration of this law should not be vested in the part time members of the Foundation.

"Adherence to the principle that responsibility for the administration of the law should be vested in full time officers who can be held accountable will not prevent the Government from utilizing with great advantage the services of eminent scientists who are available only for part time duty.

"It is unfortunate that this legislation cannot be approved in its present form. The withholding of my signature at this time, however, will not prevent the the Government from engaging in the support of scientific research.

"We must start with a law which is basically sound.

"I hope that the Congress will reconsider this question and enact such a law early in its next session."

From National Research Council:

Excerpts from Statement by Dr. Delev W. Bronk, Chairman, National Research Council.

"The President has rightly said that national security and welfare require that direct federal support be given to basic scientific research and to increasing the number of trained scientists. Accordingly, it is regrettable that differences of opinion between the legislative and executive branches of the government regarding administrative policies have barred the creation of a National Science Foundation, which would have fostered scientific research throughout the country to the general advantage of the American people.

"The need for such a foundation is great at the present time when universities are hard-pressed for funds with which to carry on essential research and when the ranks of adequately trained scientists are seriously depleted.

"Scientists generally will therefore hope that these needs may be met by the passage of legislation in the next Congress which will satisfy both Congress and those concerned with executive function and which will preserve the traditional freedom of the scientific investigator."

Senator Smith's Opinion:

"It is a great regret to me that the President has made a 'political football' out of what undoubtedly would have

been the greatest contribution made in this country by any Congress since the turn of the century. I believe the cause of science has been set back 10 years by his action," states Sen. H. Alexander Smith, Rep., N. J.

National Academy Head:

Comment on veto by Dr. Alfred N. Richards, president of the National Academy of Sciences:

"Too bad."

Dr. Karl T. Compton States:

"The veto of the National Science Foundation Bill is disappointing at a time when help and encouragement are needed. Practically everyone agrees that the universities and colleges cannot contribute their part in meeting the post-war scientific needs of the country on their prewar basis of financial support, and everyone knows that national security and prosperity require assiduous attention to science and the training of scientists.

"I believe the President was poorly advised on this action. I believe that the values of getting the program going promptly outweigh the objections to the form of the bill, which could be corrected later if in practice they proved serious." Dr. Compton is president of Massachusetts Institute of Technology.

Science News Letter, August 16, 1947

PHYSICS

Very Accurate Gauges Ground from Spheres

➤ GAUGES for highly accurate measurement of bore-holes are the subject of patent 2,423,094, issued to Dr. I. C. Gardner of the National Bureau of Standards. It is relatively easy to grind spheres of precisely known diameter from such hard stones as agate or from hard glass or fused quartz. From such spheres, cylinders or polygonal prisms may be cut, each retaining at its opposite ends a part of the original, accurately determined diameter. These constitute the gauges. Rights to manufacture and use are assigned royalty-free to the government.

Science News Letter, August 16, 1947

The Iowa cornfield thrives partly because its *calcium* content was high to begin with; the lime came from limestone ledges, ground in the great mill of the Ice Age glaciers or more recently weathered into soil.

CHEMISTRY

Stable Plastic from Rosin

➤ ROSIN is polymerized into a firm, chemically stable plastic of high melting-point through the use of the bromine or chlorine salts of mercury as catalysts, in the process on which B. L. Hampton of Jacksonville, Fla., has been granted patent 2,424,979. These catalysts replace the halides of tin and zinc used in an earlier process. Patent rights are assigned to the Glidden Company of Cleveland.

Science News Letter, August 10, 1947

Male otters when startled make a noise that resembles the "barking" of a sea lion.

SCIENCE NEWS LETTER

Vol. 52 AUGUST 16, 1947 No. 7

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00. 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

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CHEMISTRY

Extinct Elements Found

The neptunium series, heavy radioactive elements, may have existed naturally in the earth's beginning but because of short lives have become extinct.

➤ A PREHISTORIC family of heavy radioactive elements which may have occurred naturally in the earth's beginning but now is extinct was unearthed during development of the atomic bomb.

This missing link in the periodic table was found with production of synthetic elements neptunium, americium and uranium 233. It includes the recently identified elements 85 and 87, explaining fully for first time the absence of these elements from nature.

Called the neptunium series because neptunium 237 is the longest-lived of the family, it is the missing one of our four series of heavy radioactive elements. The others are the uranium, thorium and actinium series.

Two parallel investigations are reported in the *Physical Review* (Aug. 1). One was headed by Dr. Glenn Seaborg, of the University of California, while he was at Chicago, with co-authors listed as Drs. French Hagemann, Leonard Katzin, of Argonne, Martin Studier, Chicago, and Albert Ghiorso, University of California. The second study was by Canada's Division of Atomic Energy.

One of the authors of the Canadian report was Dr. Alan Nunn May, who is now serving a 10-year sentence in Britain for revealing atomic research data to Soviet Russia. Other Canadian scientists reporting on the work were A. C. English, T. E. Cranshaw, P. Demers, J. A. Harvey, E. P. Hincks and J. V. Jelley.

The reason for the extinction of the newly-discovered series is the relatively short half-life of parent, neptunium, which is two million years. The age of earth is estimated at two billion years.

Neptunium, like other heavy radioactive elements, decays by alpha particles, until it reaches a stable isotope. It decays to uranium 233, the synthetic isotope made by bombardment of thorium, and then down through isotopes of radium, actinium, francium, astatine and polonium until it reaches stable

bismuth 209. Americium, element No 95, is an even more remote ancestor of series with half life only 500 years.

The other three series exist in nature because of the long half-lives of the parents, these being four and half billion years for uranium 238, fourteen billion years for thorium 232 and seven hundred million years for uranium 235. The latter isotope was not known when the actinium series was named, but it is the actual parent.

Science News Letter, August 16, 1947

ZOOLOGY

Sickly Baby Gorilla Spends Record Time in Captivity

➤ AN 11-POUND, year-old baby which experts figured would not live long, today is a healthy six-footer weighing approximately 435 pounds.

He is Bamboo, famed gorilla who has spent 20 years in the Philadelphia Zoo. Two decades in captivity is a record for gorillas. Before Bamboo arrived here, most gorillas lived only a short time after capture.

Now, scientists believe Bamboo is right in his prime. His quarters have been strengthened by extra bars since the gorilla wandered out of his cage recently. How much longer Bamboo will live cannot be estimated with any accuracy. No one knows how long gorillas live normally in the wilds of Africa.

Science News Letter, August 16, 1947

MEDICINE

Dye Glows Under Rays To Detect Cancer Tissue

➤ A DYE that glows under ultraviolet light may help detect cancer tissue for the surgeon to remove. At present, bits of cancer that have invaded and become hidden by normal tissue may be missed at operation.

Trials of this method in 46 patients are reported by Dr. George E. Moore, National Institute of Health fellow at the University of Minnesota Medical



BAMBOO—This gorilla, once a sickly baby, has been in captivity 20 years, a record time.

School. His report appears in *Science* (Aug. 8).

Best results were obtained when the dye, sodium fluorescein, was injected into the patient's vein three to eight hours before operation. During the operation, when the surgeon has reached the point where the patient's stomach, for example, can be seen, he inspects the area with an ultraviolet lamp. Cancer tissue glows with a vivid yellow color, showing the surgeon where to cut to remove it.

Good results were obtained in 31 of the 46 cases. Most of the nine failures occurred in attempts to fluoresce large, bulky tumors within the abdomen. Cancers of the lower intestine, stomach and breast were found less likely to fluoresce. This might be due to insufficient amount of dye or insufficient time between its injection and the ultraviolet inspection.

The most consistent results were obtained in examination of brain tumors. A bit of tissue from suspected areas was sucked out with a needle and readily recognized by its exaggerated fluorescence under ultraviolet light.

The use of radioactive iodine is now being considered for aid in distinguishing more accurately between cancerous and non-cancerous tissue at operation. Certain mouse tumors could be seen better by X-ray when iodine was substituted in the dye, which suggested putting the radioactive form of iodine into the dye.

Science News Letter, August 16, 1947

RADIOACTIVITY

Disease Virus "Tagged"

First move has been made to find out how viruses enter the body and wage their destructive war. One virus has been "tagged."

➤ **DISEASE-CAUSING** viruses have become "it" in an exciting game of radioactive atomic "tag".

What is believed to be the first radioactive "tagging" of a disease-causing virus has been accomplished by Dr. Raymond L. Libby and Caroline R. Madison of the American Cyanamid Company's research laboratories in Stamford, Conn.

Scientists are now hopeful that they have made the first move toward finding out why one child catches polio and another does not, why some get colds and others don't, and how important food plants resist their virus attackers.

This latest advance is the indirect result of atomic bomb research because the radioisotopes used were manufactured in one of the giant atom smashers used in the successful attack on the atom.

The virus used in the Stamford experiments was that of tobacco mosaic. It is one of the best known of the puzzling proteins that are not alive yet act in many respects like living parasitic organisms. It was given its radioactive "tag" by inoculating it into tobacco seedlings which were then fed with radioactive phosphorus as part of their mineral nutrient solution. The

virus acquired its radioactivity from its host.

After the virus had been "tagged" it was extracted, purified, and injected into the bodies of laboratory mice to study their reaction to it as an alien protein. The response of the animals' systems was two-fold: the formation of an immunity-conferring antibody in their blood serum, and the concentration of the radioactive virus largely in liver and spleen.

Now that the way has been shown, other workers will be able to "tag" this and other viruses, and use them in various researches. Of great importance would be the study of mode of entry into, and route of migration within, the body of a number of virus diseases of man and animals, ranging all the way from the common cold to infantile paralysis. Another study might be on the structure of the relatively huge and highly complex virus molecules themselves, and especially on how they "feed" on their hosts' body compounds. Possibilities are endless, especially now that practically unlimited quantities of "tagged" elements are becoming available from the atomic pile of the Atomic Energy Commission at Oak Ridge, Tenn.

Science News Letter, August 16, 1947

RADIO

Colored Pictures by Radio

➤ **COLORED** pictures can now be received in home or office by wire or radio waves in much the same way that newspaper photographs are now received, it is claimed. They are transmitted by a new type of facsimile system.

In ordinary facsimile, pictures or printed pages are received in black and white on photographic paper, recordings being made by a beam of light, varying in intensity. In the new full-color system, the picture is reproduced with colored lead. Sensitized paper is unnecessary; ordinary paper can be used.

The new device is called "colorfax"

by its inventors, Capt. W. G. H. Finch and Dr. LaVerne R. Philpott of Finch Telecommunications, Inc. The pictures can be seen as received, and need no developing or processing in any way.

The printing mechanism is described by the inventors as something to remind one "of a small airplane motor with four cylinders at right angles to each other revolving around a central shaft. Each cylinder is loaded with a colored lead equal to a primary color, yellow, red, blue and black. As each cylinder revolves the colored leads are applied to the paper and record a line of multi-color. Then the paper moves upward a hundredth of an inch, and the next

line is recorded. The copy is made at the rate of four square inches a minute."

Sending pictures, maps, charts and printed matter by wire or radio waves is not new, but recent developments have greatly broadened its applications. Basically, the process consists in putting the copy to be sent on a revolving cylinder where it is scanned by a sharp beam of light which crosses the copy in a succession of closely-spaced parallel lines. The reflected light falls on a photo-electric cell which sends out signals corresponding to the amount received by it.

These signals are amplified and sent to the receiving instruments. In them the process may be said to be reversed. The photocell that picks them up sends a beam of light in successive parallel lines across the face of a photographically sensitized paper on which the copy is reproduced. The varying intensity of the light from the signals causes a variation in photographic action, resulting in the picture or facsimile copy.

Science News Letter, August 16, 1947

MEDICINE

New Chemical Under Trial As Remedy for Filariasis

➤ A NEW, arsenic-containing chemical is now under trial as a remedy for filariasis in dogs and man. This worm-caused tropical disease caused great worry to many of our fighting men in the South Pacific because late, untreated stages of it develop into elephantiasis.

The new chemical is announced by Drs. G. F. Otto and T. H. Maren, of the Johns Hopkins Schools of Medicine and Hygiene and Public Health, in *Science* (Aug. 1). It is known as Tropical Disease Center No. 970, has a 16-syllable chemical name and its simplest chemical description is substituted phenyl arsenoxide. It was first made in the scientists' laboratory at Johns Hopkins and later by Parke, Davis and Co.

It is the first chemical ever discovered, so far as is known, that will kill all the grown-up worms of filariasis in doses that can be given to man. Filariasis has previously been treated with antimony compounds. These, however, only remove the baby or embryonic worms, called microfilariae, from the blood. It is the grown-up worms that are believed to be responsible for blocking the lymph channels and causing the grotesque and often horrible swellings of elephantiasis.

Science News Letter, August 16, 1947

AERONAUTICS

Army Observation Plane Completing Flight Tests

➤ THE NEW Army plane, now under flight tests in Wichita, is a strange-looking craft in general appearance but it can take off and land on very short runways. It is for observation purposes, and will be delivered to the Army later this month by Boeing Aircraft Company, its builder.

It is a monoplane, with wings, conical boom from wings to tail, and inverted tail surfaces all in one assembled piece. Below the wings and the fore part of the boom is suspended a passenger-carrying boat-shaped body for pilot and observer. This houses its 125-horsepower Lycoming engine. Propeller blades are on its fore end, and landing wheels below.

The plane is designed to take off and clear a 50-foot obstacle in 600 feet. It can climb at 628 feet per minute, cruise at 100 miles an hour, and land at 35 miles an hour. It is approximately 26 feet long, and has a wingspan of 40 feet. Its gross weight is a little over a ton.

Pilot and observer in the plane have unobstructed view at all times. Large windows which slope inward at the bottom permit observation directly downward, while a transparent section overhead offers a clear upward view.

In the Army, the plane will be known as the XL-15. It is, in Army language, a liaison plane to be used in connection with Ground Forces operations.

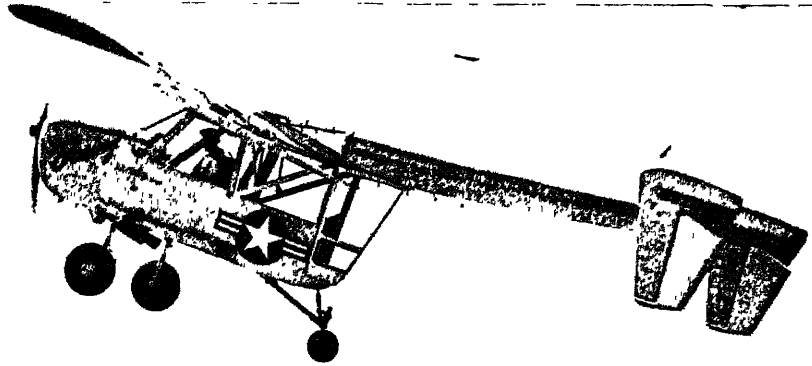
Science News Letter, August 16, 1947

PHYSICS

Electric Photocell Detects Carbon Monoxide in Plane

➤ CARBON MONOXIDE, which can be even more dangerous in airplanes than it is in automobiles, is detected photoelectrically in the device on which patent 2,425,059 has been awarded to William F. Fagen of Chicago, assignor to the Stewart-Warner Corporation. A continuous sample of the air supplied to the plane's cabin is passed through a tube containing a gel that turns dark blue in the presence of carbon monoxide. A light beam that passes through the gel in its normal state is dimmed, hence fails to excite the photocell on which it is directed. This change in current, suitably stepped up, operates a relay and gives warning.

Science News Letter, August 16, 1947



NEW LIAISON—The L-15 will be used for directing artillery fire, reconnaissance, aerial photography and emergency supply missions.

TELEPHONY

Train Telephone Service

Persons on trains can now talk with their offices or homes. Experiment is being tried on several trains running between Washington and New York.

➤ TELEPHONE conversations between offices or homes and passengers on board speeding trains became available Aug. 15, the Federal Communications Commission has announced.

An experimental service of this nature was inaugurated on that date on several Pennsylvania and Baltimore and Ohio trains between Washington and New York. Tariffs, now filed with the commission, are comparable with similar rates for regular long-distance calls.

The plan is part of the Bell system's work on a radiotelephony program to develop apparatus and methods to bring the telephone network within reach of persons on trains, automobiles, airplanes and surface ships. An experimental installation for telephone service on the famous Boston Post Road connecting that city with New York was started nearly a year ago. In that system six 250-watt land transmitters are used. One is at each end of the line, and the other four at way stations. It is similar to the system already in use in several American cities which provides telephone service between homes or offices and moving taxicabs or delivery trucks.

Induction telephone service, a different type from the other installations planned, is proposed by the Chesapeake

and Ohio Railway Co., for passengers' use between Orange, Va., and Cincinnati. The installation will cost nearly \$360,000, company officials estimate. Standing by itself, it would not be a profitable venture but the availability of the service is expected to attract additional travel.

This railroad telephone service for passengers is not the same as the radio service for train crews now in operation on many railroads and in a number of freight and terminal yards. About 100 authorizations for this type of service have already been given by government authorities. They cover some 75 land stations and 700 mobile units, since a single grant may cover from one to a hundred radio installations on engines and cars.

This railroad radio service, as it is called, was inaugurated Dec. 31, 1945, after it was shown that use of radio would benefit both the public and the industry. It was developed by the Federal Communications Commission in collaboration with the Association of American Railroads, and incorporates a geographical assignment plan to insure the utmost use of available frequencies. Wartime development of very high frequency transmission has made it possible to design radio equipment to meet the particular needs of railroads.

Science News Letter, August 16, 1947

MEDICINE

Fresh Evidence Reported For Streptomycin Over TB

➤ FROM the bodies of patients who died of tuberculosis comes fresh evidence for the power of streptomycin, medicine's new weapon against the great white plague.

The evidence is presented by Drs. Archie H. Baggenstoss, William H. Feldman and H. Corwin Hinshaw of the Mayo Clinic and Foundation in Rochester.

It is the kind of evidence, from microscopic examination of TB-infected brain, lungs, liver and spleen, that is especially convincing to medical men.

The patients died of miliary and meningeal tuberculosis. In these forms of the disease the germs are widespread throughout the body, and the meninges which cover the brain are also attacked. Before the discovery of streptomycin, patients attacked by these severe forms of TB always died.

In the dead bodies of four such patients who had been treated with streptomycin, the Mayo scientists found evidence of regression and healing of the tuberculous spots in lungs, liver, spleen and eye which in one case had been affected.

Development of widespread tuberculous meningitis apparently was checked in one case and either prevented or cured in two other cases.

The scientists also looked for evidence of damage from the drug. They found no sign of it with the possible exception of kidney damage in one case.

Their observations, they state, offer "further encouraging evidence" of the effectiveness of streptomycin as a TB remedy and "some hope for the effective treatment of two hitherto consistently fatal forms of the disease."

Science News Letter, August 16, 1947

FORESTRY

"Wetter" Water Produced For Fighting Forest Fires

➤ MAKING WATER wetter is the latest method of fighting forest fires.

To those of you who think that water is already wet enough to put out fires, it can be explained that the so-called "wetting agent" is a chemical that reduces the surface tension of the water so that it will flow better, spread out, and soak into materials instead of form-

ing beads and remaining on the surface as droplets. Thus the "wetter water" will penetrate and get things soaking wet better than ordinary water.

The U. S. Forest Service is experimenting with several of these wetting agents in the hope that, added to water, they may be useful in putting out small fires especially in grass, needles and weeds and for "mopping up" the smoldering fire on the ground after blazes in the trees have been put out.

Many wetting agents are now known and have been used as detergents in place of ordinary soap and in the textile industry to facilitate dyeing.

Among those being tried out in forest fire fighting are Drench, P-2N sulfonate, and Tergitol.

Science News Letter, August 16, 1947

CHEMISTRY

X-Rays May Solve Mystery Of Structure of Proteins

➤ SCIENTISTS may learn how proteins, the building blocks of our bodies, are put together by using a new method of mapping atoms in complicated crystals. X-rays and mathematics are teamed up in the new method developed by Drs. David Harker and J. S. Kasper of the General Electric Research Laboratory.

A beam of X-rays is shot through a crystal, which is made up of atoms arranged in some regular pattern, the experimenters explained. Atoms in the crystal diffract the X-rays to give a similar pattern on a photographic plate. From the relative darkness of the spots in this pattern, the exact arrangement of the atoms in the crystal can be mathematically calculated.

You can see for yourself how this works by holding a fine silk handkerchief or umbrella against the light from a distant street lamp. Sometimes a cross-shaped set of colored bands appears around the light. X-rays are very much like ordinary light, except that the waves in X-rays are shorter. The fibers in the silk affect the light beam just as the rows of atoms in the crystal affect the X-ray beam.

Electron beams produce similar diffraction patterns and can sometimes be used in place of X-rays. The new method works only on crystals which have some sort of symmetry, but this includes about 98% of all crystals, the scientists pointed out.

Science News Letter, August 16, 1947

CHEMISTRY

Solvent Selects Acetylene From Mixture of Gases

➤ ACETYLENE, one of the most valuable of industrial gases, can be concentrated out of the mixture of carbon monoxide, methane and other gases resulting from one production method by passage through a derivative of furfural which has a selective solvent action for this one particular gas. Discovery of this useful property in the solvent won patent 2,424,987 for Dr. Robert M. Isham of Okmulgee, Okla. Best compound for the purpose is tetrahydrofurfuryl acetate. Patent rights are assigned to Danciger Oil and Refineries, Inc., of Fort Worth.

Science News Letter, August 16, 1947

INDUSTRY

Alaska's Waste Salmon To Yield Valuable Products

➤ YEAR-ROUND industry for turning Alaskan salmon wastes into valuable products, including vitamins and drying oils, is being planned in a \$47,000 project announced by the Department of Commerce's Office of Technical Services.

Hormones, amino acids, and resin bases will probably be on the list of recoverable products, valued at an estimated \$5,000,000 to \$10,000,000 annually. Alaska Fisheries Experimental Commission will do the work under contract with the industrial research and development division of OTS. The Commission's task is to find out just what chemicals can be recovered from the fish wastes and sold.

The Fish and Wildlife Service of the Department of the Interior and the Alaska Committee of the Department of Commerce are cooperating on the project.

Year-round storage of the wastes is another unsolved problem. Fish heads, tail pieces and inner parts are now being dumped into the sea or allowed to rot at the canneries. Byproducts plants would help Alaskan fish canneries and open more all-year jobs for fishermen in Alaska's biggest industry. The project also is being planned to help conserve fish resources.

Science News Letter, August 16, 1947

DENTISTRY

Teeth Can Be Replanted Usually Only in Children

➤ IF JUNIOR falls down and knocks out a tooth, it can be replanted in his jaw. Not so, however, if his Dad gets a tooth knocked out.

Replanting of a tooth knocked out of its socket is successful only for children and usually fails in adults, Dr. Joseph T. Hartsook of the University of Michigan School of Dentistry reported at the meeting in Boston of the American Dental Association.

The shorter the interval between the accident and the time the child and his tooth reach the dentist, the better. First step in the replanting procedure is to take an X-ray to make sure the roots of adjacent teeth have not been damaged.

Care is taken to keep the tooth in good condition before replanting.

If the young patient is under school age, he is given a general anesthetic while the root canal is being sterilized and filled and the tooth replanted.

After replanting the tooth is held in place by wires attached to the sound teeth next to it. In many cases the tooth takes root again in two to four weeks.

Science News Letter, August 16, 1947

WILDLIFE

Too Much Water for Ducks Reason for Short Season

➤ TOO MUCH water, even for ducks; that is the news behind the news of the curtailed shooting season and sharply reduced bag limits established for this year by President Truman's proclamation. Detailed reports from the Canadian Department of Mines and Resources received at headquarters of the U.S. Fish and Wildlife Service confirm and extend the conclusions of American field biologists as to the growing seriousness of the duck shortage.

The same weather pattern that produced the disastrous Corn Belt floods drowned out large areas in the Canadian nesting grounds from which come most of the ducks that fly over the

shooting-blinds in the eastern part of the United States.

In other Canadian duck nesting areas water conditions are much better but prospects for next fall are just as bad. Nesting sites are there aplenty, and more than enough water and duck food; but the breeding population is either greatly depleted or missing altogether.

The only region where both duck population and breeding conditions are anything like normal is in southern Alberta and Saskatchewan. Ducks from this part of Canada fly mostly over the western states.

Science News Letter, August 16, 1947

AERONAUTICS

GCA Equipment To Become Permanent CAA System

➤ RADAR ground control approach equipment to aid airplane landing in overcast weather, has proven so successful during trial at the national capital's airport, and also at New York and Chicago commercial airports, that all three are now to be made permanent.

The tryout equipment, known as GCA, was loaned to the U. S. Civil Aeronautics Administration for these installations by the Army Air Forces. By mutual agreement, they have now been donated outright. Civilian personnel, trained by Army men, will operate them.

GCA was developed during the war at the government's laboratory on the campus of Massachusetts Institute of Technology, and widely used in America and abroad, both by the Army and the Navy, in bad-weather landings. It is a system in which planes approaching a landing strip are spotted by the GCA land crew while still in the air, perhaps 50 miles away, by scanning radar equipment. The ground crew then gets in touch with an approaching pilot by ordinary radio and directs him to the proper position for immediate approach and on the downward glide until he is near enough the ground to see the strip and make the "touch" on his own.

Thousands of safe landings have been made by Army and Navy pilots on landing fields so enclosed in fog that they were entirely invisible from the air. The equipment is expensive, and its primary use at commercial airports will probably be as an assist to other instrument landing equipment and will be used in particularly dense weather.

Science News Letter, August 16, 1947

ZOOLOGY

Two Coyotes Entertain Yellowstone Park Visitors

➤ TWO COYOTES in Yellowstone National Park have been giving the bears keen competition for the tourists' attention—and food. During the past few weeks they have been begging for food along the main park highway between Midway Geyser Basin and Nez Perce creek, some 10 miles from Old Faithful geyser.

The coyotes have caused traffic jams seldom excelled by the so-called "bear jams". The two coyotes have been photographed extensively.

Yellowstone visitors in the past were lucky to even see a glimpse of gray coyote stalking his prey off the sagebrush plains or darting among the timber. However, the coyotes give the tourists a fine vocal show nearly every night with their loud yipping and barking.

For coyotes to beg for food and pose for pictures along the road has been until now unheard of in Yellowstone's colorful history.

This diamond anniversary year of the founding of Yellowstone Park finds two "little wolves" putting on a very unusual show, much to the delight of visitors.

Science News Letter, August 16, 1947

ANTHROPOLOGY

South African Ape-Man Had Beginnings of Chin

➤ FIRST PERSON in the world to stick out his chin was the very ancient ape-man of Sterkfontein cave in South Africa. Newest discovery of remains of this puzzling race is an almost complete lower jaw of a large male, only eight feet from the spot where the skull of an old female was found.

Drs. R. Broom and J. T. Robinson of the Transvaal Museum, describing this relic in the journal, *Nature*, state that "on the lower part of the front of the jaw there is a little bony thickening which might be regarded as an incipient chin." Lack of chin is what makes so many prehistoric races look unattractive to modern man.

Other features of the jaw are decidedly human, especially the teeth and the joint with the skull. "The whole jaw," state the discoverers, "is practically a human jaw."

Science News Letter, August 16, 1947

CHEMISTRY

Cloth Out of Test Tubes

Chemistry is the answer to the problems of shrinking, wrinkling natural fiber fabrics. Treated textiles last longer and can be made rot-proof as well as water-proof.

By A. C. MONAHAN

► DAINTY summer dresses need no longer muss; seersucker suits may remain fresh and presentable. Pleats in skirts and creases in trousers will seldom need renewal in the steam pressing shop. And summer woollens will be cool and never shrink.

Chemistry is the answer. Textile chemists have been busy during the past decade. New treatments, which give cloth longer life without altering the general appearance, add many other desirable qualities.

They tend to make them shrink-proof, water-proof, wrinkle-proof, rot-proof, distasteful to moths and mildew, and resistant to flame and stain.

War-Hastened

The war is not responsible entirely for the new cloth treatments, but it did hasten the development of some of the new chemicals used, and their applications. American clothing on soldiers and sailors went abroad, from frigid Baffin Bay to torrid New Guinea, to meet every known climatic condition in the world.

Special treatment of cloth for clothing, tents and other uses was essential to give them lasting qualities. Special weaves helped make some cloth warmer and others cooler. Water-proofing gave added comfort in all regions. Rot-proofing and mildew-proofing were important in the tropics. Flame-proofing aided fighting men wherever they were.

During war years, military needs held priority of the new materials. Now, however, they have been improved, adapted to general uses, and are available to the civilian population.

Traditionally, cloth and looms are always associated. Textiles are woven fabrics. Also traditionally, all cloth is made from natural fiber obtained from plants or animals. Textile fiber is now being made artificially from non-fibrous material in coal, corn cobs, soybeans, peanuts, milk, woodpulp, and even from sand converted chemically into glass in the form of very fine, but not transparent, fiber.

These synthetic fibers can be woven on a loom. A new process, however, makes the loom unnecessary. The fibers are laid close together, side by side and crosswise, and bonded with a resin, heat-treatment and pressure between rollers.

There are also cloths, or sheeting, made without fibers. The well-known Cellophane is an example. They are made of plastic materials, some more or less rubber-like, spread in thin sheets and subjected to a curing process. The familiar nylon used as a fiber in women's stockings and other garments can be used also in a non-fiber form.

The present so-called "plastics age" holds no threat over fiber growers and textile manufacturers. Someone must grow much of the materials used to make plastics. But there will always be a demand for woven goods. In fact, the best uses for some of the new materials are in treating textiles. The plastic best suited for making sheeting is finding one of its principal uses as a coating over woven cloth. Another use is in the plastic film field.



LADY IN GLASS—All fabrics are not made of natural or plastic fibers, one that isn't being cloth from glass fiber.

In the film field, the usual plastic used is either vinyl chloride or some of its close relatives. In the fabric coating field, the older materials, such as nitrocellulose, rubber, oils and alkyds, are being supplemented with vinyl resins. Vinyl chloride and its so-called copolymers make up the bulk of these coating materials. Vinyl butyral forms a coating over cloth that is practically invisible.

Whether made of natural or synthetic fiber, woven or bonded, most cloths can be treated or so made that they have many desirable properties unknown in fabric of the past. Non-shrinking shirts and collars, and dresses that do not catch afire easily will add to comfort on one hand and safety on the other. Combustible clothing, accidentally touching a gas flame, has caused the death of many children.

New Fiber Treatment

Among the new fiber-treating materials is one with Resloom for a trade name, made by Monsanto Chemical Company. This synthetic chemical is relatively new but already has been well tested. Rayon goods treated with it are on the market. Cotton and woollens will follow. Exhaustive tests on both have not been made.

One of its principal abilities is to decrease shrinkage, even of woollens, to a negligible amount. When treated with Resloom, wool shrinkage is only about 3% as compared with the usual 25% to 50% of the same fabrics untreated. In addition it stabilizes the wool so that extremely thin cloth suitable for summer all-wool garments can be woven.

Resloom is a resin known chemically as melamine formaldehyde. When wool, cotton or rayon is treated with it, the chemical enters the heart of the fiber and remains there for the life of the cloth. The basic fiber is not injured. Goods treated may be washed or dry-cleaned and ironed as usual. Resloom can be used with known water-repellents, fire-retardants and anti-mildew agents. The Resloom itself prevents muzzing and gives the long-life crease in men's trousers.

Arutex Cream 450 is the trade name of a product of the American Cyanamid Company. One of the chief resins used for spun rayon and rayon mixtures, it is a popular resin for crease-proofing linens as well as certain cotton fabrics,

particularly voiles. It is a water-soluble, partially condensed, urea formaldehyde resin in paste form. Because of the small size of its molecules it can penetrate the textile fiber. A curing process fixes it within the fiber cells.

When applied to certain fabrics under the minimum of tension, shrinkage control is also obtained. When used in combination with another resin made by the same company, permanent water repellence and anti-crease finish are obtained in one bath.

Rot-proof cotton cloth is something new in the textile field. It is not a quality particularly essential in the clothing field but, being mildew-proof as well, is suitable for garments to wear in hot countries. Its greatest value is in cloth that is in contact with the ground, but also in tents, awnings and bags for fruits and vegetables.

This rot-proof cotton is a development of the U. S. Department of Agriculture in its research laboratory at New Orleans. It is a modified cotton, a partially acetylated cotton somewhat related to rayon made by the acetate process. In tests it failed to rot during six months under ground in soil where ordinary cotton would rot in a week or two.

Not All for Clothes

Not all of the new chemically or otherwise treated fabrics are designed for clothing. Some are treated to assure longer life when used in upholstery or to provide beauty and safety from fire hazards when used as draperies. Flame-resistant fabrics are essential in night clubs and other public places where people assemble.

Other fabrics are treated for easy cleaning. A new table cover which resembles ordinary linen, can be kept clean on the table by wiping with a damp rag. Still others are waterproof sheeting for hospital and other uses. These can be made into raincoats and capes, and into protecting panties for baby.

Then, there is a gold- or silver-colored fabric that has many decorative uses in the home although designed for use in public places. It is a metal-coated plastic fabric that has a mirror-like finish. Its trade name is Miromesh, and it is made by the National Research Corporation.

The base material in this fabric is a mesh that resembles wire screening with the spaces filled with a cellulose acetate film. The fiber of the mesh is a well-known plastic called Saran, a com-



NON-INFLAMMABLE—Treatment makes fabrics resistant to flames and water.

pound of polyvinylidene chloride, which is highly resistant to most chemicals.

The mesh, filled with the acetate, is coated on one side with a thin film of aluminum applied by a high-vacuum process. This is covered with a protective lacquer. Over the silver finish, it is a clear lacquer; a gold-colored lacquer is used for the gold finish.

Beautiful draperies that defy fire, made by Plymouth Fire-Guard Fabrics, are woven of a combination of very fine glass fiber and flame-proofed cotton yarn. They are designed particularly for use in public places but are suitable in homes. They come in a wide range of colors and can be dry-cleaned, cut, sewed and ironed as easily as all-cotton materials.

In the future, the buyer of clothing will have to go further than the looks and the feel of the fabric. He will have to take the manufacturer's word for the invisible substances contained and, until tested, his word for the special qualities added to the cloth.

Science News Letter, August 16, 1947

DENTISTRY

Dental Drilling Painless With Topocaine Anesthetic

➤ A NEW anesthetic for taking the pain out of the dentist's drill was announced by Dr. Gustav William Rapp of Loyola University School of Dentistry at the meeting in Boston of the American Dental Association.

The anesthetic is put right on the spot that would hurt when the dentist drilled. It is not necessary to inject it into the gum by hypodermic needle. In limited tests it was successful in three out of four patients.

The anesthetic is a mixture of two

older ones, procaine and benzocaine, in an alcohol solution. In most cases it takes only one or two minutes to take effect.

Dr. Rapp said that additional experimentation will be necessary before the new anesthetic, which he calls topocaine, can be recommended for general use by dentists.

Science News Letter, August 16, 1947

AERONAUTICS

Scout and Rescue Plane Passes Rough Water Tests

See Front Cover

➤ THE NEW Navy Seahawk, the Curtis SC-2, has completed successful rough water landing tests at the Naval Air Test Center in Patuxent, Md., after repeated take-offs and landings simulating conditions encountered in the open sea.

The new seaplane is a version of the Curtis SC-1 which made its first flight early in 1944. The SC-1 took active part in warfare later, its first action being in 1945 in the pre-invasion bombardment of Borneo. It is a low-wing monoplane with wings that fold back for storage on shipboard. It is a single-seat affair.

The new Seahawk is much like its brother but is a more rugged plane that can withstand rough water when afloat. This is important because this shipborne plane is not only a scout and fighter but is also a rescue craft. One feature of the new version is a separate door which allows a person rescued from the sea entry to a compartment and seat behind the pilot.

Science News Letter, August 16, 1947

Molds grow on anything from which they can get enough food.

Do You Know?

Fatal accidents in U. S. National Parks during 1946 numbered 29.

A *bullet* will ricochet off the surface of water as it does from a solid surface

Much of the world's fertile *farm lands* of today were sea bottoms in very ancient times.

Wood *gutters* on houses have become common recently due to shortages of metals.

Seashell collecting, a summer sport to many, is to scientists a help in unravelling a geological structure in a quest for oil, metals, or deposits of building materials

Visitors to an *electronic* exhibition in New York can see themselves televised and at the same time see the television picture of themselves on a screen.

American *tung-oil* industry, although still young, is reaching \$10,000,000 proportions; tung tree orchards are now located in all the states touching the Gulf of Mexico.



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ASTRONOMY

1947 Record Comet Year

➤ THIS YEAR may set a new record for the discovery of comets, a Harvard College Observatory astronomer disclosed.

So far this year, astronomers have found eight new comets in the heavens. The all-time yearly record was set in 1932 when 13 comets were discovered.

"If we keep on at the present rate, 1947 may become the record year in the discovery of new comets," Dr. Fred L. Whipple explained.

Dr. Whipple, who discovered one of the most spectacular new comets of the past two decades, discussed comet-hunting as a guest of Watson Davis, director of Science Service, on Adventures in Science heard over the Columbia network.

Although astronomers have found a bumper crop of new comets this year, you would not have been able to see any of them without a powerful telescope. The only comet found this year which has been visible to the naked eye could be seen only in the Southern hemisphere.

Comet-finding is an international job, Dr. Whipple emphasized. Ten comets, including newly-discovered and previously-known ones, are now being observed by astronomers. These 10 discoveries were made in eight different countries, the astronomer reported.

Observations from almost all of the civilized countries of the world are used when astronomers calculate the paths of comets about the sun, Dr. Whipple added.

Comets appear as a hazy patch of sky, but actually they are millions of miles away, the astronomer pointed out.

These August nights, you can see the annual shower of the broken remains of a comet, Dr. Whipple said. The pieces of the comet are shooting stars, or meteors.

Each August, he explained, we can see the Perseid meteors, which seem to come from the constellation Perseus, the champion. Actually these shooting stars are the skeleton fragments of a comet discovered in 1862.

Dr. Whipple predicted that meteors will become a traffic hazard when man starts traveling out into space.

One might cruise around in space

for a lifetime without colliding with a meteor, but the driver of a space ship will have to avoid the paths of comet debris where meteors are most likely to be.

"He should try to avoid running through the orbits of the larger comets where much meteoric matter might exist," Dr. Whipple said, "in the same fashion as a bus driver should try to avoid driving over tacks, nails and rough roads that might ruin his tires."

Colliding with meteors would be a more serious matter, though. These so-called shooting stars move at high speeds, and the astronomer estimated that a pinhead meteorite, if made of steel, would penetrate a quarter-inch steel plate.

Science News Letter, August 16, 1947

ENTOMOLOGY

Beehive Air-Conditioning Pays Keeper in More Honey

➤ AIR CONDITIONING for bees pays, Leroy Bell of Orange, Calif., has found. He keeps his beehives—42 of them—inside a long chamber in which temperature and humidity can be controlled at levels the bees like best. They aren't what human beings would find comfortable, for optimum temperature from the bees' viewpoint is between 80 and 85 degrees Fahrenheit, with relative humidity from 60% to 65%.

Under these living conditions Mr. Bell's bees are so good-natured that he can work on the hives without headnet or gloves. He states that they produce more honey, rear better queens, and are less apt to raid neighbor-colonies to steal honey.

Science News Letter, August 16, 1947

CHEMISTRY

Coloring Ripe Oranges

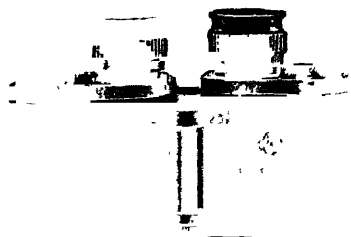
➤ BECAUSE some varieties of oranges are not orange when they are fully ripe, it is considered legitimate to dye their skins to a more attractive hue. An improvement in this cosmetic treatment, consisting of a thin wash of a wax in which an oil-soluble pigment is dissolved, is protected by patent 2,425,073, granted to J. N. Sharma of West Los Angeles, Calif.

Science News Letter, August 16, 1947

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ECOLOGY

NATURE RAMBLINGS

by Frank Thone



Goats Play the Devil

➤ SATAN, in modern comic and semi-serious art, is drawn as a man with several decidedly goatish features. He has cloven hooves, and goat's horns top a long capricious countenance that usually has a "goatee" at its lower extremity. Sometimes, too, his ears stick out like a billy-goat's.

Sometimes it is contended that these symbolisms are simply transfers from the ancient Greek goat-god, Pan. That may or may not be true historically. If it is, however, it would assign to Pan a role much deeper and more malicious than the mere untamable, irresponsible freedom which Pan was supposed to symbolize. For real, flesh-and-blood goats, pastured by people for their wool and milk and meat, quite literally play the devil with the land over which they trample and nibble. They represent the last, hungriest, most destructive stage of over-grazing.

Cattle and horses may crop the grass down to the last inch if too many of them are run on the range. Sheep will take that last inch, leaving only the

roots in the ground. Goats will take even the roots, and thereafter browse on the woody shrubs that invade the pastures when grasses and other good herbs have been all eaten up. In the meantime, their restlessly trampling, sharp-edged hooves keep the soil surface cut up, ready to blow with the wind or wash with the rain.

This is not an imaginary cycle. It has happened over and over again, especially in the Mediterranean lands. Pan, the goat-god, was not only a denizen of the rocky wilderness. He was to a considerable extent the creator of the wilderness.

The ultimate devil in the destruction of the land, however, is neither Pan nor his four-footed prototypes. Man, not Pan, must take the final responsibility. For goats, however wild they may run,

are brought into new places by human herdsmen. If their numbers become such as to loose the damnation of erosion on the land, it is due either to the need or the greed of the men who control the size of the herds.

Thus far, in our own West, we are in the cattle-and-sheep stage of over-grazing. Goats have not yet entered the picture as an important element. If we keep on at the present clip, another generation or two may see little horns and sharp hooves where bison and antelope were in balance with nature a couple of generations ago. Then we shall know that America has been added to the world's list of hungry lands.

Science News Letter, August 16, 1947

DENTISTRY

Use of Sodium Fluoride

Chemical shows great promise in curbing tooth decay but must be used with caution. Four applications to teeth are necessary.

➤ ENTHUSIASTIC reports on sodium fluoride as a means of curbing tooth decay, with caution against misuse of this chemical, were presented at the meeting in Boston of the American Dental Association.

Applying this chemical to the teeth of children under 12 years has reduced tooth decay as much as 40%, Dr. John W. Knutson, senior dental health surgeon, U. S. Public Health Service, reported.

He called sodium fluoride "one of the most promising chemicals in curbing dental decay among children."

Four applications of a 2% solution of the fluoride are necessary to achieve the desired results. Treatments, he said, should be completed in one to two months.

This use of sodium fluoride followed the discovery some years ago that small amounts in the drinking water materially reduced the amount of tooth decay in children who drank such water during the years their teeth are being formed. As a result, a number of communities have started adding small amounts of fluorine to their water supplies.

How the fluorine acts to prevent tooth decay is not known but it is agreed the chemical makes tooth enamel harder to dissolve in acid.

The American Dental Association has

recommended that all dentists apply dilute solutions of the chemical to the teeth of all child patients during the course of routine dental treatments.

Fluorinated tooth pastes and powders and mouth washes, however, have not proved effective in controlling decay, Dr. F. J. McClure, of the U. S. Public Health Service's National Institute of Health, declared.

He warned against the use of fluoride tablets, or pills, unless taken under a dentist's or doctor's prescription. Too much fluorine, he pointed out, can cause ugly mottling of the teeth and can damage the kidneys.

Science News Letter, August 16, 1947

GENERAL SCIENCE

Latin American Scientists Win Grants for Work Here

➤ LATIN-AMERICAN scientists will conduct studies in fields ranging from earthquakes to medicine in this country under John Simon Guggenheim Memorial Foundation fellowships.

A total of 29 Latin American fellowships have been granted with total stipends of \$80,000. The fellowships are granted to scientists, scholars and artists of 11 Latin American nations and Puerto Rico.

Science News Letter, August 16, 1947

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AMERICAN HISTORY FILMS—Anne B. Cridlebaugh and Lili Heimers—*N. J. State Teachers College*, 9 p., paper, 25 cents. A selected list for senior high schools.

THE ANNUAL OF THE AMERICAN SCHOOLS OF ORIENTAL RESEARCH, Vol. XXIV for 1944-1945—Millar Burrows and E. A. Speiser, eds.—*Am. Schools of Oriental Res.*, 138 p., illus., \$3.50. This volume contains a description and discussion of over 1000 seal impressions on tablets discovered at Nuzi prepared by Dr. Edith Porada.

THE ARBORETUMS AND BOTANICAL GARDENS OF NORTH AMERICA—Donald Wyman—*Chronica Botanica*, Vol. 10, No. 5/6, 97 p., illus., paper, \$1.50. A documentary account of the existing botanical gardens, their location, method of establishment and types of work pursued.

BOISSIÈRE'S PYTHAGOREAN GAME—John F. C. Richards—*Scripta Mathematica*, 40 p., paper, 50 cents. A translation of Boissière's treatise on the game, *Rythmomachia*, the harmony and battle of numbers.

CONCISE ANATOMY—Linden F. Edwards—*Blakston*, 548 p., illus., \$5.50. A text for students in a wide variety of fields: nursing, physical therapy, dental hygiene, physical education, medical technology, embalming, etc.

THE ENGRAMMES OF PSYCHIATRY—J. M. Nielson and G. N. Thompson—*Thomas*, 509 p., \$6.75. A presentation of the anatomy and physiology of human behavior.

ENZYMES AND THEIR ROLE IN WHEAT TECHNOLOGY—J. A. Anderson—*Inter-science*, 371 p., \$4.50. The first volume of a series of monographs sponsored by the American Association of Cereal Chemists, only those enzymes of particular interest to cereal chemists are discussed.

FIRST SESSION OF THE GENERAL CONFERENCE OF UNESCO PARIS NOVEMBER 19-DECEMBER 10, 1946: Report of the United States Delegation—U. S. Dept. of State—*Govt. Printing*, 157 p., paper, 35 cents. A statement of their achievement and program for 1947.

FREE TEACHING AIDS—Lili Heimers—*N. J. State Teachers College*, 19 p., paper, 50 cents. Addresses from which may be obtained charts, maps, publications, pictures, etc., free, suitable for all age groups.

GRAPTOLITES OF NORTH AMERICA—Rudolf Ruedemann—*Geol. Soc. of Am.*, 652 p., illus., \$9. A study of the 700 species, varieties, and mutations of North American Graptolites, establishing the distribution of all forms on this continent.

HEAT PUMPS—Philip Sporn, E. R. Ambrose, and Theodore Baumeister—*Wiley*, 188 p., \$3.75. A discussion of the problems involved in adapting the heat pump not only to building heating and cooling, but to applications in the industrial field for evaporation and purification of liquids, drying of solids, and simultaneous heating and chilling of process fluids.

THE INSECT CRANIUM AND THE EPICRANIAL SUTURE—R. E. Snodgrass—*Smithsonian Misc. Coll.*, Vol. 107 No. 7, 51 p., illus., paper, 40 cents. A new interpretation of the anatomical facts of the epicranial suture.

A MANUAL OF BEEKEEPING FOR ENGLISH-SPEAKING BEEKEEPERS—E. B. Wedmore—*Longmans*, 2nd ed. rev., 389 p., illus., \$5. Additional help for the bee-keeper who is not a beginner: condensed technical information on queen-raising, swarming, diseases, etc. presented.

MATHEMATICS. Visual and Teaching Aids—Frances Goon, Charles W. Martin, and John J. O'Brien Jr.—*N. J. State Teachers College*, 30 p., paper, 75 cents. List of pamphlets, films, slides, charts, etc.

NURSING CARE IN CHRONIC DISEASES—Edith L. Marsh—*Lippincott*, 237 p., illus., \$3. A discussion of the problems involved with different types of chronically ill patients, specific nursing and therapy.

ONE HUNDRED YEARS IN YOSEMITE—Carl Parcher Russell—*Univ. of Calif.*, rev., 226 p., illus., \$3.75. An account of the discovery and preservation of Yosemite, including a chronology of events connected with the park and an extensive bibliography.

PHYSICS—Constance Marie Conroy and Helen Ward Mackay—*N. J. State Teachers College*, 25 p., paper, 50 cents. A selected list of aids to teaching: charts, exhibits, films, slides, publications, and recordings.

PRECISION SHOP MATHEMATICS—William Herbert Edwards—*Heath*, 314 p., illus., \$2.48. A text for technicians enrolled in trade extension classes and to meet the mathematical needs of shop men.

REPORT ON THE AGRICULTURAL EXPERIMENT STATIONS 1946—U. S. Dept. of Agric., Office of Expt. Stations—*Govt. Printing*, 172 p., paper, 35 cents. A summarized account of the various research projects undertaken and their progress; development of new varieties of grain, berries, improved animal nutrition, vegetables, human nutrition and home management.

RUSSIAN DANDELION (KOK-SAGHYZ) AN EMERGENCY SOURCE OF NATURAL RUBBER—W. G. Whaley and J. S. Bowen, comp.—*U. S. Dept. of Agric.*, Misc. Publ. No. 618, 212 p., illus., 55 cents. A summary of investigations conducted from June 1942 to June 1944, during which time experiments were conducted on the large-scale production of this plant as a source of rubber.

SIGNS AND SYMPTOMS; Their Clinical Interpretation—Cyril M. MacBride—*Lippincott*, 439 p., illus., \$12.00. Of practical value to the physician in helping him obtain pertinent descriptions of symptoms from the patient and interpret them.

SOME IMPLICATIONS OF THE CERAMIC COMPLEX OF LA VENTA—Phillip Drucker—*Smithsonian Misc. Coll.*, Vol. 107 No. 8, 9 p., illus., paper, 20 cents. Indicating

a culture growth for the Meso-American, the result of interchanges between a number of local centers instead of one single Mayan fountainhead.

UNUSUAL WORDS; How They Came About—Edwin Radford—*Philosophical Lib.*, 318 p., \$3.75. A collection of the principal proverbial "tags," phrases and words, together with their origins and derivations.

VERTICAL FLIGHT—Parlee C. Grose—*General Pub.*, unpagged, illus., paper, \$1. A discussion of various factors involved, including sections on "beodynamics," rotary wing, and Magnus-effect rotor lift.

WHEN THE EARTH QUAKES—James B. Macelwane, S. J.—*Bruce*, Science and Culture Series, 283 p., illus., \$5. A dramatic presentation of the movements of our earth, their measurement, prediction, and interpretation in the light of geophysics.

THE YEARS AFTER FIFTY—Wingate Johnson—*Whitelsey House*, 153 p., \$2. Designed to help the person approaching old age prepare sensibly for this period mentally, physically and spiritually by discussing various problems which may arise.


Science News Letter, August 16, 1947

A very high ceiling may be made to appear lower by carrying the ceiling color down the sidewalls to the tops of the windows.

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⊗ **ATTACHMENT** to a paint brush keeps paint off window panes when painting sash. It consists of a broad arrow-shaped light metal guard on the end of a flat spring fastened to the brush handle, which fits over the bristles and holds them away from wrong surfaces. The guard slides up the spring when not needed.

Science News Letter, August 16, 1947

⊗ **VISIBILITY METER**, for measuring night visibility of traffic paint and roadside signs, is a visual instrument within which light reflected from the paint is compared in brightness to an illuminated comparison panel attached within to a numerical scale. The panel is rotated by the operator.

Science News Letter, August 16, 1947

⊗ **SOFT DRINK VENDER** automatically serves a cup of Coca-Cola when a nickel is inserted in a slot. Mechanism drops a paper cup into place, and delivers into it syrup and carbonated water under pressure. The customer lifts a small glass window to get his drink. The device automatically makes change for a dime or quarter.

Science News Letter, August 16, 1947

⊗ **PENCIL SHARPENER**, electrically operated and shown in the picture, gives a medium, fine or superfine point by regulating a three-position lever. Housed in molded plastic, it contains a



drawer to catch the sharpenings. A draftsman's model sharpens only the wood, leaving the lead untouched.

Science News Letter, August 16, 1947

⊗ **ELECTRIC HEATER** for kitchen uses, ranging from frying eggs, browning pies, and defrosting refrigerators to removing paint, is carried in one hand like a skillet, the six-inch heating housing being elongated and tapered. The housing is so shaped that all heat is radiated in one direction.

Science News Letter, August 16, 1947

⊗ **NON-SKID MAT**, designed particularly for home or factory workers who stand long periods at table or bench, has both upper and lower surfaces covered with hundreds of quarter-inch-high rubber cones. It cushions the feet, protects from damp floors, and prevents shocks from static electricity.

Science News Letter, August 16, 1947

⊗ **GLARE SHIELD** for automobile drivers, for attachment to the windshield by a rubber suction cup, can be swung up or down by a flip of the finger when not needed. Made of a tinted plastic, it cuts the glare while the driver watches the road by looking above or below the shield.

Science News Letter, August 16, 1947

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Question Box

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Why has a shorter season for ducks been established this year? p. 105.

Pictures: Cover, U. S. Navy; p. 99, Rohm & Haas Co.; p. 101, Philadelphia Zoological Society; p. 108, Army Air Forces; p. 107, Science Service.

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SCIENCE NEWS LETTER



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RADIO CORPORATION of AMERICA

ASTRONOMY

Daytime Meteor Shower

Radar has discovered a display of meteors, hidden by sunlight. For three months the "shooting stars" have sped to earth.

➤ A DAYTIME meteor shower that peppered the earth for three months has been discovered by radar.

This new display of "shooting stars" is blinded out by sunlight. It would never have been found by the old-fashioned method of visual observing or even by photography. It could be detected only by the war-developed electronic method of bouncing radio echoes off objects, thus locating them. Meteors are pin-head sized particles that bombard the earth's atmosphere only to vaporize in a flashing instant.

Dr. A. C. B. Lovell, director of the University of Manchester's radar research on meteors, has announced the

discovery in a communication to the British Astronomical Association.

Early in May the meteor shower was picked up as "pips" in the radar signal. The shower continued until early this month when it diminished markedly. Each day there was a peak in the meteor shower at about 11 a. m. The meteors seem to come from about the direction of the sun, which is an astronomical effect due to the varying motions of the sun and earth. Daylight prevents them from being seen visually.

Often the hourly rate of meteors recorded by radar has exceeded 80, and at the daily height of the shower never fell below 20.

Science News Letter, August 23, 1947



OFFENSIVE WEED—The tall ragweed grows as high as 15 feet, with stiff, reedy stalks.

BOTANY

Hayfever Weeds Bloom

Ragweeds are beginning to spread their poisonous pollen in the North and will soon be blooming in the South. Here is how to curb them:

See Front Cover

➤ RAGWEEDS have come into bloom, spreading hayfever in northern and central states, and will soon be doing their mischief in the South as well. Yet there is still time to check the shedding of their poisonous pollen with the new weed-killer, 2,4-D, if prompt action is taken.

If you don't suffer from hayfever, you will be doing a kindness to many of your neighbors if you will spray 2,4-D solution on the weeds in your neighborhood, and rouse the community to attack all along the line.

Ragweeds are the worst of our offensive weeds. Their pollen, floating invisibly in the air, makes eyes red and watery, noses puffy and sneezing. The number of persons susceptible to ragweed pollen is probably far less than that of ivy-susceptibles, but whereas you have to go to the poison ivy to be poisoned, the ragweed sends its pollen wherever summer breezes blow, so every hayfeverite is sure to be bothered if

he stays in ragweed territory during pollen-shedding time.

There are several kinds of ragweed, of which two are most abundant and most widely distributed. The common or low ragweed has finely divided leaves on tough, wiry, much-branched stems usually two or three feet high, although eight-foot thickets of it have been reported from Florida. It ranges from the Atlantic coast to almost the base of the Rockies, with its greatest abundance in the Corn Belt.

The tall or giant ragweed has leaves with three large lobes growing on tall, reedy stalks that get to be as much as 15 feet high. Usually they are thickly massed and hardly branched at all, but when a specimen gets enough room for itself it will branch freely and not grow so high.

Foliage of both weeds is coarse and disagreeable to the touch. That of the low ragweed has a taste so bitter and rank that nothing will eat it, not even a goat. Horses and mules will eat the leaves of the tall ragweed; presumably

one of its aliases, horseweed, is in recognition of this.

Flowers of the two plants are much alike, though the flowers of the tall ragweed are much larger. Unlike most familiar flowers, the sexes are borne separately though on the same plants. It is the male or pollen-bearing flower-clusters, borne at the tops of the stalks and branches, that are the trouble-makers, of course. If you are not subject to hayfever, you can get a demonstration of their producing capacity by gently shaking a ragweed. The resulting pollen shower will be astonishing.

Since these flowers have no petals, many people do not recognize them as flowers at all. And because they and the goldenrod are in bloom at the same time, the goldenrod often gets the blame for hayfever. This in an intolerable libel on a beautiful and innocent plant.

Ragweeds begin blooming in the latitude of Minnesota early in August, and the wave of their blossoming rolls southward for about three months. Peak of pollen production in the region of Chicago is about the end of August; it does not come until early October in the neighborhood of Houston, Texas. The season is much shorter in the North than in the South.

2,4-D attack on ragweed can be made at any time. Standard solution is one part 2,4-D to 1,000 parts water. Spraying should be done on still, warm days, to avoid injury to neighboring plants.

It is best to strike it early, of course; but if that has been neglected there is still time even after the pollen-shedding begins. Any given ragweed plant will shed pollen for several weeks, with new flowers coming to maturity all the time. But if the plant gets its dose of 2,4-D it will be crippled if not killed, and the shedding of pollen will stop very soon. Fortunately for us, ragweed is one of the most sensitive of plants to the poisonous action of 2,4-D.

In the Midwest, this should be an especially good time to go after ragweeds, because their thickest stands, especially of the tall species, are on flat river-bottom lands. The floods blotted out millions of acres of ragweed this summer, along with the cornfields, so in many places the spraying crews will

have only the upland ragweed patches to deal with.

In cities, ragweed thrives most rankly on wastelands—the neglected patches between tracks in railroad complexes, on vacant lots, around tumble-down abandoned houses and other buildings. It used to be necessary to send scythe squads to do the sweaty job of mowing them down; now it can all be done with a sprayer.

Of course, there will still be hayfever even if all the ragweed patches in your community are accounted for. The pollen is very light, and the wind carries it for miles from masses still growing in the country. But it is worth while to kill city ragweed patches anyway, for every reduction in pollen density in the air will benefit hayfever sufferers.

Science News Letter, August 23, 1947

MEDICINE

Weapon Checks Cancer

Chemical, urethane, is being tried against cancer of the prostate gland and has been successful in some cases. It is poisonous drug.

➤ A NEW CHEMICAL weapon against cancer is being tried at the University of Chicago. This chemical is called both ethyl carbamate and urethane.

It causes "inhibition" (checking) of some cases of cancer of the prostate gland, Drs. Charles Huggins, Sung Ting Yu and Ralph Jones, Jr., report in *Science* (Aug. 15).

Considerable decrease in size of the cancer, relief of pain and an improved sense of well-being occurred in three patients with widespread cancer of the prostate who were treated with this chemical.

The chemical, however, is a relatively poisonous drug. One patient who was given it for 33 days showed improvement at first, but six days after the drug was stopped, he died of necrosis of the liver. Much smaller doses were given to other patients without harm and with some improvement in their condition.

The drug must be given with great caution, the doctors warn, and the number of white blood cells must be checked frequently. When these drop to less than 4,000 per millimeter or when the patient is nauseated, the drug must be stopped.

The chemical is one of a number the Chicago doctors have been investigating for use in cases of cancer of the prostate that have relapsed after being con-

trolled for a time by anti-male hormone treatment.

The anti-male hormone treatment was introduced by Dr. Huggins several years ago. It consists in either surgical removal of the male sex glands or treatment with female sex hormone or both. It is not completely satisfactory because, although the patients at first improve, 80% of them relapse in less than five years.

The favorable effects of urethane are not due to anti-male hormone action or to interference with the cancer cell's nutrition.

The chemical also has a suppressive effect on a transplantable cancer of rats, the Chicago doctors found.

Ethyl carbamate, or urethane, has previously been used as a sedative and, with quinine, in the treatment of varicose veins.

Almost half a century ago the German scientist, Otto Warburg, discovered that small amounts of this chemical would check cell division in fertilized eggs of the sea urchin. Last year a group of English scientists, Drs. E. Haddow and A. Paterson and their associates, reported that it caused a temporary but significant slowing of the growth of mouse breast cancer and a cancer in rats and had a very great palliative effect in human leukemia.

Science News Letter, August 23, 1947

CHEMISTRY

Old-Fashioned Insect Bane To Give DDT Competition

➤ DDT, 666 and some of the other new synthetic insecticides may presently have competition from a modernization of an old-fashioned discourager of insects, black pepper. Edward Harvill, chemist on the staff of the Boyce Thompson Institute for Plant Research at Yonkers, N. Y., combines piperine, extracted from pepper with alcohol, with pyrethrin, to make a highly potent insecticide. A one-tenth per cent solution made a 99.8 per cent kill of flies in one test, he states. His patent number is 2,425,530.

Science News Letter, August 23, 1947

SCIENCE NEWS LETTER

Vol. 52 AUGUST 23, 1947 No. 8

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N. Y. C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439.

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ECONOMICS

England Short of Resources

Britain's crisis is partly due to a shortage of natural resources for manufacturing and little land to raise food. Fuel shortage is possible.

➤ ENGLAND'S present situation might be likened to that of a manufacturing city without enough raw materials on hand to keep factories going full blast to turn out consumer goods to make the purchase of raw materials possible. Add to this a possible shortage of fuel to power the factories, and little land to raise food.

England is primarily a great factory. It has a poor economic balance between industry and agriculture. It depends on the outside for most of its food. Also it is a very "short" nation in the raw materials that are the essentials in its manufacturing. England lacks domestic metals, textile fibers and wood. Much of its manufacturing depends upon these materials. It has plenty of coal, underground, but very little other fuel.

England's greatest asset in the industrial game is its coal. This makes manufacturing possible, and also transportation by railroad and ocean. Only limited hydroelectric power can be generated, and the amount of petroleum that can be mined is almost negligible. Coal in pre-war days not only met domestic needs but established credits in continental Europe making it possible to get raw materials from the nations buying the coal. England has enough coal for many generations; the present difficulty is getting enough out of the ground. Sufficient coal for export would help the present situation.

But Britain needs more. A manufacturing nation without its own raw materials must have foreign markets for its manufactured articles to establish the necessary credits to enable it to purchase the materials needed. Under normal conditions, England has the facilities and human skills to produce what the world needs, and to receive manufacturing materials in their place. The movement of raw materials and finished products kept railroads and steamships busy, providing occupation for those not in factories, mining or farming.

The British Isles, excluding independent Ireland, are about the size of Oregon and have a population of some 48,000,000. England itself is Alabama's size, and had a prewar population of 39,000,000. Only one-sixth of it was rural. English farmers produced less than one-third

of the food the country required.

England's iron ore supply in comparison with manufacturing needs, is very small. Although textiles are among the country's principal products, it raises no cotton and relatively little wool in comparison with the needs of its woolen and worsted industries. It has but little wood for its wood products output. The principal exports, outside textiles, are machinery, vehicles, electrical and other goods that require metals in making. British spirit may overcome present difficulties, but it will require time.

Science News Letter, August 23, 1947

HORTICULTURE

New Hybrid Onion Strain Not Very Tearful to Peel

➤ PEELING ONIONS will not be the tearful job it is now, once a new hybrid onion strain originated by Dr. Glen N. Davis of the University of California comes into more general cultivation.

Dr. Davis has eliminated a large part of the pungent, volatile compound that affects housewives' eyes even more strongly than the sobbiest scenes in "soap-

opry." It is impossible to eliminate all of it, for then there would be no flavor left in the onion, he says.

The new near-tearless onion has a mild sweet flavor, and is especially good for eating raw.

Science News Letter, August 23, 1947

ENGINEERING

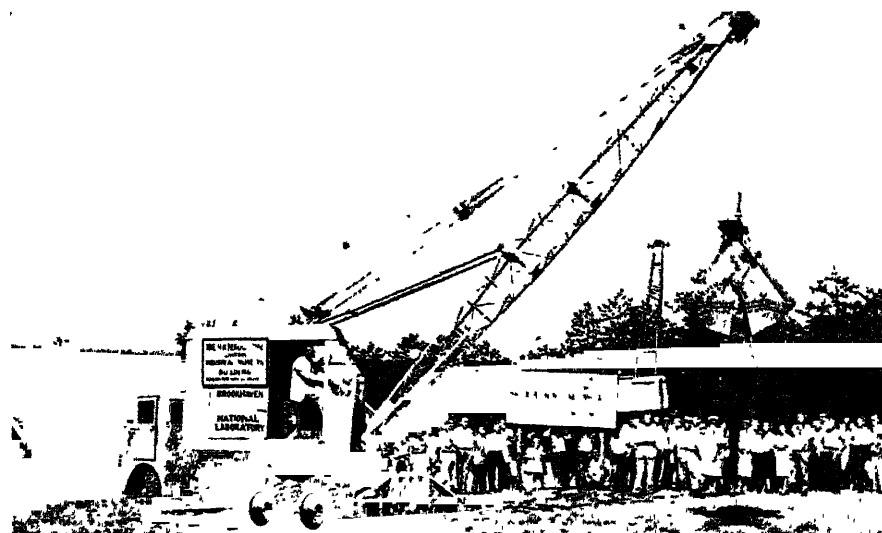
Plated Wire Made to Give Non-Flakable Covering

➤ ELECTROPLATED wire, made by a new process so that it can be bent, hammered, woven or twisted without flaking, is now in production in the new plant of Kenmore Metals Corporation. It will be appreciated particularly by the radio tube industry and by makers of electric lamps and electrical instruments, but will have many other applications.

In the process, quarter-inch rods are first electroplated continuously with great accuracy. Then they are drawn into fine wire by what is known as the cold-drawing process. This means that they are passed through a series of successive dies or holes in a metal plate, each hole being smaller than the preceding one. The quarter-inch rod can be drawn into wire as fine as 0.0038 of an inch in diameter.

Initial production includes steel wire coated with nickel, and copper wire coated with nickel or silver. The copper-coated wire will have wide usage in radio tubes and lamps and also in many household utensils.

Science News Letter, August 23, 1947



NUCLEAR SCIENTIST RUNS STEAM SHOVEL—Dr. Lyle Borst, who headed the atomic pile design group at Brookhaven National Laboratory, ceremoniously scoops up the first bit of dirt excavating for the first peacetime atomic pile on the site of wartime Camp Upton. When the pile starts operating next year this spot will be one of the "hottest" on the earth, radioactively speaking.

INDUSTRY

Ruhr Area Vital to Europe

This section is important not only to the industrial recovery of Germany but to western Europe. Conference discusses Ruhr production.

➤ THE IMPORTANCE of the Ruhr coal conference in Washington, attended by American and British officials, is centered around the question of sufficient production to permit the industrial recovery not only of Germany itself but of much of western Europe.

The Ruhr area in prewar days sent some coal to other countries but, more important, it supplied many nations in Europe with steel and steel products essential in industries. For several years before the war it was producing about 20% of the total world output of steel. One reason that this area achieved so much in steel production is due to its excellent coking coal, for steel production depends upon a supply of good coke. Another reason was that the area is easily reached by ships bringing iron from Sweden, Spain and other places.

In addition to the British and Americans meeting to plan greater output from Ruhr coal mines, the French have a great stake in this crucial area. One importance of the Ruhr coal to France is for a good coking coal for steel production from the great iron ore deposits

in Lorraine, northern France. There is plenty of coal available nearby in the former Saar area of Germany, but it does not make good coke. Ruhr coke could be easily brought to the French iron district by the Rhine and its tributaries and canals.

The Ruhr valley is ideally situated for a great steel-producing business. It stretches eastward from the Rhine up the Ruhr river, which has been made navigable for many miles by dredging and the building of locks. It is this water transportation that permits foreign iron ore to reach the Ruhr furnaces, and permits the shipment outward of the steel manufactured.

Germany, in prewar days, had a second industrial area producing both coal and steel. This was in Upper Silesia, an area that now is within the boundaries of Poland, and is under Russian control. It never was such an important steel manufacturing region as the Ruhr, one reason being that it lacked the good transportation facilities. Its production now will probably go to Soviet-controlled areas.

Science News Letter, August 23, 1947

ANIMAL HUSBANDRY

Heat Is Bad for Animals

➤ "WELL, it's good for the corn, anyway!"

This grain of consolation, which Midwesterners like to roll on their tongues during dog-days, loses much of its value in the light of new researches on farm animals' reactions to heat. Hot weather may make corn grow fast, but it makes hogs and steers slow down their meat production, cuts cows' yield of milk and causes hens to lay fewer eggs.

These disconcerting facts were brought out in a talk by J. Robert McCalmont of the U. S. Department of Agriculture. Mr. McCalmont, who is in charge of research on animal housing, spoke as the guest of Watson Davis, director of Science Service, on *Adventures in Science* over the Columbia Broadcasting System.

The farm animals that produce our meat, milk and eggs, the speaker pointed

out, are unable to keep cool through the evaporation of sweat. They get rid of some of their excess body moisture by rapid breathing or panting; pigs wallow in the mud; cows stand in water. But all these are inefficient cooling systems, and all the animals are likely to slow down their body fires by eating less—which is exactly what we don't want them to do.

Since the climate of the Corn Belt is not likely to change materially, the best thing that can be done for the animals is give them more comfortable quarters—cooler in summer and warmer in winter. Just how much cooler and how much warmer remains to be determined, for up to now the climatic conditions under which farm animals will operate most efficiently have not been thoroughly studied.

That is the program on which Mr. McCalmont is now working. As soon as he has learned, by as exact experimental methods as possible, the temperature and moisture conditions under which cows will give most milk, hens lay most eggs, and hogs and steers produce most marketable meat, he will draw up recommendations for a farm-animal housing program which he estimates will call for an annual outlay of \$1,500,000,000.

Science News Letter, August 28, 1947

AERONAUTICS

High-Wing Monoplane Made Into Temporary Biplane

➤ MAKING a high-wing monoplane into a temporary biplane or sesquiplane is the solution offered by J. S. Conner of Los Angeles to the old problem of getting extra lift at takeoff and landing. An auxiliary pair of lower wings, which also carries the landing wheels, folds into recesses in the main wings during flight. The patent number is 2,425,306.

Science News Letter, August 23, 1947

CHEMISTRY

Waste Bark Has Valuable Plasticizing Material

➤ A WAXLIKE material known for a century to exist in the bark of pine trees promises to become one of the most important substances in the modern making of plastics.

Prof. H. von Euler of Sweden reported to the International Chemical Congress in London that this bark product, called phlobaphene, is a new and cheap softening agent or plasticizer.

Bark is a waste product in lumbering operations and its utilization is a problem. Manufacture of phlobaphenes from the bark will help solve this difficulty and give the plastics industry a new material. The plasticizers from bark are suitable for replacing plasticizers from castor oil and alkyd products, as well as the phthalic acid derivatives, made from coal.

Up to 30% of synthetic resins produced consists of the plasticizers. Thus the volume of the bark materials needed will be large.

The chemical nature of these phlobaphene bark substances has been determined by Prof. von Euler and they are described chemically as catechol esters of different saturated and non-saturated aliphatic acids, containing 16 to 22 carbon atoms.

Science News Letter, August 23, 1947

GENERAL SCIENCE

Board To Plan Research

Research and Development Board will be staffed with top-flight scientists and will plan use of money available for research.

➤ ONE of the boards set up in the new "national military establishment" headed by Secretary of Defense Forrestal will have more to say about the direction of scientific research and development in this country than any other group.

It is the Research and Development Board, heir to the Joint Research and Development Board which has been headed by Dr. Vannevar Bush, wartime director of the Office of Scientific Research and Development.

The Army and Navy have had large amounts of money to grant to colleges, research laboratories and industrial organizations for digging into new problems and developing applications of recent science developments. With the creation of equality between Army, Navy and Air Force, this full-scale and well-implemented research support will continue unabated.

Failure of the National Science Foundation to materialize as expected will throw a continued obligation on those military branches. They have the money and they will use it in the exploration of fields far removed from shot and shell but nevertheless essential to future fighting strength.

The Research and Development Board, with a staff of top-flight scientists largely from the wartime OSRD, has the job of allotting research fields among the various services and seeing to it that no hot leads are overlooked.

Although the unification act provided a chairman of the board, presidentially appointed from civilian life, "with compensation at the rate of \$14,000 a year," this does not mean the replacement of Dr. Bush, who has been heading the joint board on a part-time basis, just as he ran the OSRD and remained president of the Carnegie Institution of Washington as well. The way seems to be open for Dr. Bush to continue as chairman, thanks to "at the rate of" wording of the act, and he will probably do so.

It is not too much to say that the chairman of this board will be the most powerful person in the nation in the allotment of scientific research funds. He will be the only member of the board

of seven who is not a representative of Army, Navy or Air Force. He will decide differences between the three services.

Of major importance are the two other boards that are created under the unification act. These are the National Security Resources Board and the Munitions Board. The Resources Board's closest approach in the past was the War Reconversion Board, headed by James Byrnes before he became Secretary of State. It is policy-making in industrial and civilian mobilization, in use of natural and industrial resources, in strategic and critical materials, in strategic relocation of all the nation's activities.

The Munitions Board is concerned more directly with procurement, production and distribution among the armed services, but it will be concerned also with the important matter of the adequate reserves of strategic and critical materials.

Science News Letter, August 23, 1947

ENTOMOLOGY

Two New Chemical Weapons Used in Mosquito Warfare

➤ MOSQUITOES have two new chemical-warfare weapons to face, that are expected to make life more miserable—and shorter—for them in future summers. Both weapons have been demonstrated by Dr. Elton J. Hansens.

The first is a pint-size, one-man version of the big insecticide fog-machines

that have come into use for large-scale attack during the past year or two. It is known as a mosquito fumer. It consists of a can containing a nicotine product, plus fuel to convert this into a thermotog. To operate, a lighter somewhat like a Fourth of July sparkler is first ignited, then pushed through a diaphragm on one end of the can. The fumes continue to be effective against mosquitoes for two or three hours.

The second device demonstrated by Dr. Hansens is called a pinstream oiler, and is intended for use against mosquito larvae or "wigglers" in marshes and ponds. Hitherto, fuel oil has had to be applied to such places, at a rate of about 25 gallons per acre, and since this work has to be done mainly on foot this is a rather terrific burden. Now, one gallon of a concentrate containing 1.5% DDT and 0.5% of a spreader will treat the same area that used to require 25 gallons of oil.

Science News Letter, August 23, 1947

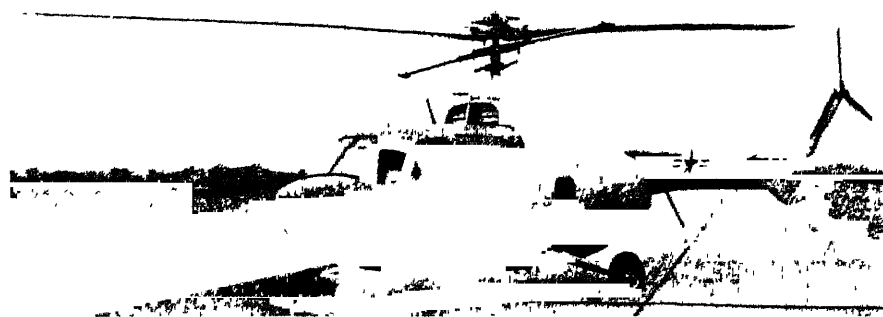
HORTICULTURE

New Jersey Orchid Crop Gets Special Attention

➤ ORCHIDS, as well as peaches and tomatoes, pig rations and silo stuffing, are getting scientific attention at the New Jersey State Experiment Station. There's a reason: New Jersey is the home of the greenhouses where fully half the commercially-grown orchids in the United States are produced. The crop is worth three million dollars a year.

Under the direction of Dr. O. W. Davidson of the Station staff, studies are being made on the effects of growth hormones on orchid bulbs, stems and flowers, also on the light and humidity requirements of the temperamental plants, and the acid-alkali balance on which they thrive best.

Science News Letter, August 23, 1947



FIVE-PLACE HELICOPTER—The Army XR-12, with a top speed of 105 miles an hour, is undergoing preliminary tests. A two-bladed rotor system is used with a gyroscopic action stabilizer bar.

ARCHAEOLOGY

Pottery-Makers Used Coal Centuries Ago in Arizona

➤ **DIGGINGS** in the pueblos of Hopi Indians in Arizona indicate that coal was used in this country in the 13th century in burning pottery, the U. S. Bureau of Mines revealed.

The archaeological investigations have produced proof of this in unearthing old coal workings in which the primitive tools used for mining were found.

Virginia is recognized as the first state within the present limits of the United States in which coal was mined commercially. This was in 1750 in the Richmond coal basin, where coal was found about 1700. Coal was found by white men in Arizona in 1881, but production even in these latter years in that state has been only about 10,000 tons annually.

Science News Letter, August 23, 1947

MEDICINE

Synthetic Vitamin K Aids X-Rays in Cancer Fighting

➤ A **SYNTHETIC** substitute for vitamin K, the anti-bleeding vitamin, is being tried as a weapon against cancer.

No curative value is claimed by the Cambridge University scientists, Prof. J. S. Mitchell and Mrs. I. Simon-Reuss, in their report to the journal, *Nature*.

But, they report, the vitamin K substitute checked the division of cancer cells. The division process, known as mitosis, is that by which more cancer cells are produced and the cancer grows.

When X-ray treatments were given after the vitamin had been injected into the muscles daily for several weeks, the effect on cancer cell division was even more pronounced. Bits of tissue from a cancer on the floor of the mouth were examined under the microscope. After the synthetic vitamin K substitute treatment there was a "highly significant reduction" in the frequency of cancer cell division. This would indicate that the cancer's growth was being checked.

X-ray treatments were then given and after that it was impossible to count the dividing cells in a bit of the cancer tissue because all the cancer cells were grossly degenerate. Similar checking of cell division was observed in chick embryos.

The synthetic vitamin substitute had no toxic or ill effect on the 25 patients to whom it was given, showing that it

would be safe to use if it proves effective.

The anti-bleeding action of vitamin K was first discovered in relation to chickens. It has since been used to save newborn babies and sick grown-ups who were in danger of bleeding to death in certain kinds of jaundice and liver disease.

Science News Letter, August 23, 1947

NAVIGATION

Collars Make Buoys Easy to See at Night

➤ **REFLECTING COLLARS**, that fit around harbor, bay and river buoys to mark shipping channels, make the anchored warning floats more easily seen at night when searchlight beams fall on them.

The principle employed is similar to that used in roadside reflectors to warn automobile drivers. Their installation has been revealed by the U. S. Coast Guard which already has several thousand in place on New England waters and in the Mississippi river area.

The reflecting material is sheet metal and is either red or black, depending upon the color of the buoy. In the surface of the metal band are many small crystals that cause the reflection. These buoys are visible at all angles because the minute crystals reflect light beams striking them from any direction.

Science News Letter, August 23, 1947

CHEMISTRY

Improved Method Extracts Thorium from Minerals

➤ **ONE** of the most widely known of British chemists, Dr. Frederick Soddy, retired Oxford University professor, has received U. S. patent 2,425,573 on an improved method for extracting thorium from minerals containing it.

Thorium is another element with an unfamiliar-looking name; actually, however, it was a household article not so long ago. Its oxide was the stuff gas mantles were made of. It is still used in ceramics and other industries, and is a definite possibility in the development of atomic energy.

Basically, Dr. Soddy's method consists of using less sulfuric acid than customary in getting the thorium out of the phosphatic minerals, and in exploiting the phosphoric acid thus released in the separation of cerium and other rare-earth elements from the thorium.

Science News Letter, August 23, 1947

IN SCIENCE

NUTRITION

Dried Celery Tops Found To Make Good Chicken Feed

➤ **CELERY TOPS** and trimmings make good chicken feed when dried. Research at the Florida State Agricultural Experiment Station has shown that dehydrated celery tops compare quite well with alfalfa meal as a chicken feed, and the tops are now being commercially dehydrated at Sarasota and Tampa.

Heretofore, approximately 75,000 tons of celery trimmings have been hauled from Florida packing houses to fields each year and used as fertilizer.

Science News Letter, August 23, 1947

PARASITOLOGY

Rubber Tree Termite Pest Attacked by New Fungus

➤ **TROPICAL** termites are not satisfied with a diet of houses, furniture, books and other valuable things made of wood and its products; some species infest living trees. One species, in particular, has become a pest of the plantation rubber tree, *Hevea brasiliensis*.

Now it appears that this pest becomes victim to a pest of its own, a fungus that parasitizes and kills it. This discovery has been reported to the editor of *Nature* (July 26) by R. A. Altson, a scientist on the staff of the Rubber Research Institute of Malaya, at Kuala Lumpur.

Mr. Altson had numbers of the pest termites caged in his laboratory for study. He found that they were dying off faster than they normally should. Postmortem examinations disclosed a fungus in their bodies.

It proved easy to propagate this fungus on rice-bran. Healthy captive termites fed on rice-bran thus infected died to the last insect within 48 hours. Similar numbers of uninfected termites had a mortality of only three per cent. The evidence seems conclusive.

It was already known that a Cuban termite genus is similarly infected by a fungus known botanically as *Conidiobolus*. The Malayan fungus appears to be similar to this, though not identical with it. For this reason Mr. Altson regards his discovery tentatively as a new species.

Science News Letter, August 23, 1947

THE FIELDS

CHEMISTRY

New Glycol Type Alcohol Has Unusual Properties

► **USEFUL** as a dirt remover, a new glycol alcohol has a combination of properties not found in other such chemicals. It is expected to have wide usage in soaps and what are known as cleaning detergents, and also in oils, greases, and lubricating preparations.

One type of glycol is well-known. It is used in anti-freeze mixtures in automobile radiators. This is ethylene glycol. The new type, developed by Celanese Chemical Corporation, is methylpentanediol. It has a higher boiling point, 215 degrees Centigrade. It has unusual solubility for a wide range of resins, and mixes well with common solvents. It has limited solubility in water.

Glycols are alcohols somewhat similar to the common ethyl alcohol, and also somewhat similar to glycerine. The best known of them, the ethylene glycol, is a colorless liquid with a boiling point of 197.5 degrees Centigrade and, in solution, freezes at a temperature several degrees lower than the freezing point of water. The unmixed ethylene glycol freezes at about minus 16 degrees Centigrade.

Science News Letter, August 23, 1947

NUTRITION

World Food Outlook Grim With Increased Shipments

► **MOST** of the hungry people of the earth are going to have to keep their belts pulled tight for another year, despite a large step-up of grain imports into deficit areas, according to the Food and Agriculture Organization of UN.

Shipments of the crop year 1947-48 will amount to between 30 and 34 million tons of grain, as against 28 million for 1946-47. But the minimum need is for from 34 to 38 million tons. Even with increased quantities of potatoes, sugar and fats, FAO comments, "the situation will continue to be grim."

There is still time, the report continues, to help our hungry neighbors to help themselves with a better 1948 harvest in their own lands. This can be done by increasing shipments of farm

machinery, fertilizers and pesticides during the next six months.

For long-term improvement in world dietary conditions, FAO sees a necessity for modernizing agriculture in Asia, together with building up other industries at which the crowded populations of that continent may earn a living off the land. With this should go the opening of lands on the world's last great frontiers, Africa and Latin-America.

At the forthcoming Geneva conference, to open Aug. 25, representatives of the 60 constituent members will be asked to decide upon a proposal to set up a council for the carrying out of a five-point program intended both to meet present emergency food situations and to work towards a stabilized increase in the world's nutritional condition.

Science News Letter, August 23, 1947

DENTISTRY

Diet To Banish Pain After Tooth Is Pulled

► **A HIGH** alkaline diet will prevent pain after a tooth has been pulled, Dr. Leonard S. Morvay of Newark, N. J., advised at the American Dental Association meeting in Boston.

For 24 hours before and 48 hours after tooth pulling, he tells his patients to eat a diet including plenty of citrus fruits and juices, leafy green vegetables and tomatoes, and at least one quart of milk daily.

Such a diet gives the blood a heavy alkalizing, he said, and this makes for ideal healing conditions in bony tissue.

Acid-producing foods should be avoided. These include meat, fish, fowl, fats, cheese, grain, sweets, cranberries, rhubarb, alcohol, coffee, tea and chocolate.

Excessive exercise should also be avoided, Dr. Morvay advised, because it creates lactic acid and lessens the body's alkali reserve.

Patients having teeth pulled should always, in his opinion, drink large quantities of water following the operation.

A high acid content of the blood is usually present in cases of "dry socket," he said. This is a condition in which a satisfactory blood clot has not formed after the teeth are pulled. In many such cases, pain persists even after the patient is given morphine or other sedatives. Bone tissue, he said, does not regenerate quickly when the acid content of the blood is high.

Science News Letter, August 23, 1947

BIOCHEMISTRY

Wild Mushrooms Contain Penicillin-Like Compounds

► **ANTIBIOTICS**, or penicillin-like compounds, are not only in soil molds but in their evolutionally higher relatives, the fleshy fungi or mushrooms. A survey by Dr. William J. Robbins and a group of co-workers at Columbia University and the New York Botanical Garden disclosed germ-stopping powers in 213 out of 332 species of mushrooms examined.

Now Dr. Robbins, with Dr. Frederick Kavanagh and Miss Annette Hervey, have made a more intensive study of two species of wild mushrooms cultivated in the laboratory, and have been able to isolate the antibiotic substances in them. From one species, *Pleurotus griseus*, they have obtained a substance which they have named pleurotin, and they suspect that the mushroom contains a second antibiotic, not yet isolated. Pleurotin is able to check growth of the boil germ, *Staphylococcus*, as well as the tuberculosis germ in laboratory vessels. Beyond determining that it is non-toxic to white mice in moderately heavy doses its possible medicinal value has not yet been explored.

The second mushroom species, *Polyporus biformis*, yielded two germ-stopping compounds which have been named biformin and biforminic acid. Biformin proved effective against the two test organisms, the germs of boils and of tuberculosis, in glass vessels. Addition of rabbit blood greatly reduced its activity, so that it was not surprising to find that it had no effects against the same two germ species in the bodies of mice.

Details of the research are given in two reports published in the official journal of the National Academy of Sciences (June).

Science News Letter, August 23, 1947

CHEMISTRY

DDT Relative Recommended Because It Is Not So Toxic

► **METHOXYCHLOR**, close chemical relative of DDT but claimed to be only one-fortieth as poisonous to man and warm-blooded animals, was recommended for that reason as a protector of fruits and vegetables to the meeting of the International Apple Association by Dr. W. H. Tisdale, du Pont research chemist.

Spelled out in full, methoxychlor is bis-(methoxyphenyl)-trichloro-ethane.

Science News Letter, August 23, 1947

CHEMISTRY

Dyes from Your Garden Plants

Onions, beets and flowers yield rich, warm colors. Many of these will not dye the same as the colors of the flowers. Mordants make variety of shades.

By MARTHA G. MORROW

➤ THE GREEN stain of grass across your shirt or the red juice of berries on your dress may spell trouble to you because it is hard to remove—but to your ancient ancestor it may have suggested a new source of color.

Many ancient dyes were discovered entirely by accident. The earliest dyes were probably stains from berries, fruits and nuts. Early man liked the color of the stain, discovered it lasted despite the sun and rain, and began to use it to dye his fabrics.

Later, flowers, leaves, stems and roots of shrubs, bark and twigs of trees were found to be good sources of dye. Primitive people of almost every country seem to have developed their own favorite dyes.

Vegetable Dyes First Used

At first, dyestuffs of vegetable origin, available in the neighborhood, were the only ones used. The primitive dyer merely collected flowers, berries, leaves, bark and roots in nearby fields or forests, and boiled them in water to extract the dye. Colors were limited pretty much to red, yellow, green, blue and brown. Few variations in shades and tones were possible.

In time, however, some dyes proved more satisfactory than others. Sometimes this was because the colors were more pleasing, sometimes because they lasted

longer. As dyestuffs found in one district were recognized to be superior to those of another, dyestuffs were imported from neighboring regions and trade in them began. Eventually many of the dyestuffs used in ancient times were eliminated as unsatisfactory, so that only a few survived the test of time.

Natural dyes are seldom used today. Chemical dyes, discovered in recent years, have proved so popular that there is little demand for the old-time favorites such as indigo (blue), madder (red), woad (blue), logwood (purple) and fustic (yellow). But many people interested in weaving and embroidery insist that the materials be dyed with natural dyes, valuing the colors for their richness and warmth.

The gay goldenrod blooming in the field or along the roadside is an excellent source of dye. The fresh, bright flowers give a lovely yellow-orange. But dye can also be secured from the faded flowers that have passed their prime or from the dried-up petals that remain on the stalk long after frost. The color, though perhaps not so brilliant as that secured from the fresh flowers, is pleasing and lasts well.

A burnt-orange dye can be secured from the dry brown outer skins of onions. Tea leaves produce a lovely rose-tan. Twigs pruned from apple trees may be used to dye cloth a golden yellow.

Some dyes give their color directly to the wool without any preliminary prep-

aration. For others, the fiber must be specially prepared before it can take the color. Because the auxiliary chemicals make the dye "bite" better into the material, they are called "mordants." This comes from the French word *mordre*, meaning to bite.

Alum found in local mineral deposits was used by the Egyptians, Chinese, Greeks and Indians of both America and Asia as a mordant. Today potash alum is considered an excellent mordant. Cream of tartar is frequently used with it to brighten the color. Another popular mordant is potassium dichromate.

Variety of Shades

A given dyestuff can be made to produce a variety of shades or even different colors by using different mordants. Dahlia flowers used with a chrome mordant, for example, on wool produce an orange color. But a light yellow is obtained with alum.

To obtain the desired color or shade, it is often necessary to dye one color over another. Green is produced by dyeing the cloth blue with indigo, then dipping the wool in a dye obtained from goldenrod flowers. To get a light terra cotta, some experts obtain a brass shade from broomsedge, then top-dye the cloth with madder.

Good black dyes are difficult to obtain. Black can be produced, however, by dipping a piece of wool mordanted with alum in the indigo vat, then dyeing it in the brown obtained from walnut hulls. If iron salts are used, black dyes can be made from oak galls, sumac leaves or other plants containing tannic acid.

Pastel shades are the ones most frequently produced with vegetable dyes. Yellow and brown are most likely to be obtained by an amateur experimenting with easily available plants. The better vegetable dyes last well and are improved by the mellowing touch of time.

The amount and intensity of a dye obtained from a plant often vary with the age of the plant. The younger ones usually give a weak dye. A plant with a great deal of water in it usually gives a dilute color. Plants collected in the fall do not necessarily produce the same shade as those collected from exactly the same locality in the spring. It is difficult to duplicate the exact shade of a vegetable dye.

The color of a flower is no guide to



DYESTUFFS—Berries, roots and leaves found everywhere can be used in dyeing.

the shade of dye it will produce. Brightly colored autumn leaves are not a source of dye. Berries are often disappointing.

A dye that is fast on one fiber may not be so satisfactory on another. Or it may be fast when dyed by one method and not at all fast when applied by another. Of all the textile fibers, wool is the best. It can be dyed easily and the resulting colors change the least. It combines with practically all dyes.

For those who want to discover for themselves which plants are a good source of dye, here is a standard recipe that can be tried on almost any plant part, be it blossom, leaf, root or bark. For each pound of cloth, use a peck of fresh dye-plant. Crush or tear into small pieces, then cover with water and soak overnight. Boil the plant for about an hour, then strain off the colored broth. To this dye extract add enough water to make four gallons for the dye bath, place the wool in the liquid and simmer for 30 minutes. Rinse the cloth and let dry.

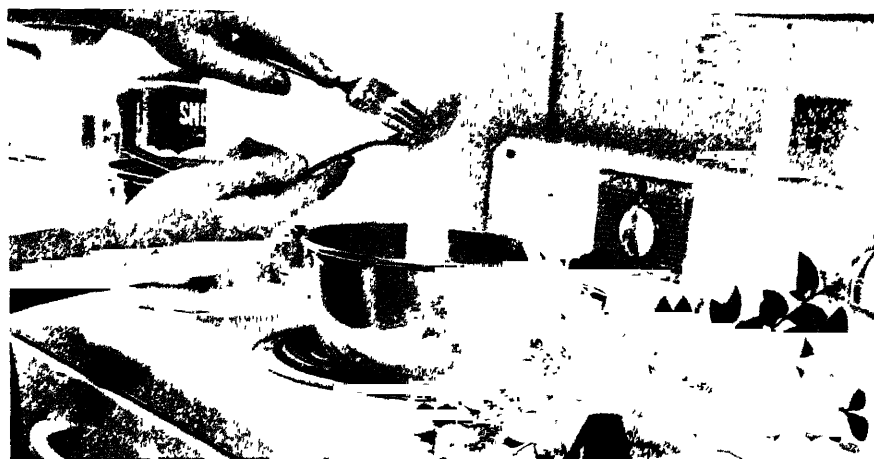
Those who prefer to dye just a small piece of cloth each time until the exact shade desired for a scarf or pocketbook has been produced can use only a handful of flowers, leaves or roots each time. Just be sure to cover the dye-plant well with water when you let it soak overnight and replace the water as it boils away.

Mordant Required

A large number of natural dyes require a mordant. Madder, for instance, produces no color on the wool unless alum, chrome or some other mordant is used. The lovely gold dye of privet leaves is entirely lost if a mordant is not employed.

One of the simplest mordanting recipes calls for four ounces of potash alum, one ounce of cream of tartar and four gallons of water to each pound of wool. After the alum and cream of tartar are dissolved, the wool is immersed in the solution and heated gradually to a boil. After boiling for an hour, it is allowed to cool and the wool remains in the mordant overnight. Then the liquid is squeezed out, the wool rolled in a dry towel and placed in a cool place until ready for use.

The fastness or permanence of a dye is important, but no dye is absolutely fast under all conditions. It may be fast to light, or to perspiration or to washing, but not fast to all three. A number of simple tests, similar in principle to those



DYE BATH—It is only necessary to boil the raw materials in water to bring out the color. But you may get an entirely different color from what you expect.

used in testing cloth professionally, can be applied in the home.

A series of cut-outs will show whether a color will fade in the sun. Cut openings an inch square in two pieces of heavy cardboard. With gummed paper fasten the dyed cloth to one of the pieces so that the cloth shows through the cut-out. Cover the cloth with the other piece of cardboard, being careful to have the openings correspond so the light comes through the fabric. Put the frame in the direct sunlight and tilt toward the sun. After a dozen sunny days, comparing the area exposed to the sun with the protected portion will show if the dye is sun-fast.

A two-inch square of dyed wool sewed to a similar piece of undyed wool will help show how water affects the dye. If this is placed in a fruit jar partly filled with soapy water and shaken thoroughly for about a half hour, you can pretty well tell how it will withstand washing. After the water has been squeezed out and the sample rinsed a number of times and ironed dry, unsatisfactory colors will have faded or "bled" onto the undyed piece.

The late summer or autumn garden offers a wide variety of natural dye sources. A large number of experiments has been worked up for the benefit of those interested in obtaining dyes from what is available in and around the home. These, plus three of the ancient vegetable dyes and a mordant are contained in a kit specially prepared for you by Science Service. Just send 50c to Science Service, 1719 N St., N. W., Washington 6, D. C., and ask for the Vegetable Dye Kit.

Science News Letter, August 23, 1947

VETERINARY MEDICINE

Sulfur Found To Prevent "Over-Eating Disease"

➤ A TIME-TESTED remedy from grandma's medicine chest has become the newest way of preventing the most serious disease of lambs in the West.

Confronted with the problem of cutting down feeder lamb losses due to the "over-eating disease", technically known as enterotoxemia, four Colorado veterinary scientists decided to experiment with ordinary ground sulfur mixed with the lamb's feed.

Results of this treatment over an extended test period are reported in the *Journal of the American Veterinary Medical Association* (Aug.). They indicate that it was of distinct value in keeping down "over-eating" losses on feedlots. While mortality ranged as high as 8.2% in untreated control lambs, losses of treated animals did not exceed 1%.

The researchers, J. F. Christensen, A. W. Deem, A. L. Esplin, and F. Cross, all of the Colorado Agricultural Experiment Station, said there was some reduction in grain consumption and daily weight gains of lambs fed relatively large doses of sulfur, but no toxic effects were observed. They believe that by reducing the amount of sulfur fed in continuing experiments, the unfavorable effects upon weight gains and grain consumption may be eliminated without sacrificing the benefit of the experiment.

Science News Letter, August 23, 1947

So popular has the insecticide DDT become that it is now being produced at a rate of over 3,000,000 pounds a month.

Do You Know?

Almond hulls are a fairly good source of *tannin* for leather making.

Crude *petroleums* from no two fields in the world are exactly alike.

Infants need three to four times as much food *protein* per pound of body weight as adults, it is claimed.

Eggs are likely to absorb odors, so should be stored away from strong-smelling foods.

"*Pickling*" as used in the steel industry consists of giving the semi-finished steel a bath in sulfuric acid to remove tiny surface scales.

Corn is still America's most important agricultural crop; the amount raised has a value equal to the total of the principal small-grain crops.

If the bottoms of utensils used in *picnic cooking* over open fires are rubbed with soap before using, the soot is removed easily.

Aluminum *paint* is satisfactory on radiators in the home because the heat of the radiator will not cause it to chip as it does to certain other paints.

Storms that cause static near a radio transmitting station do not affect distant receiving sets; the static does not ride in on the same wave that brings the program.

Although the *sun* is some 3,000,000 miles farther away from the earth in July than it is in January, the weather is hotter in the northern hemisphere because the sun is more nearly overhead.

Sugar beet seed for American crops, prior to and during World War I, was obtained from abroad; the seed is now raised in this country, and quantities were exported to the Allies during World War II.

Economic life in the far-flung Pacific *Marshall Islands*, which America will now supervise, is based largely on coconut, breadfruit, pandanus and fishing; as a result of the war, the natives now want American canned foods to give variety to their diet.

PHYSICS

X-Rays Disguise Jewels

New tube gives stones colors that make them look more valuable. Sunlight brings back the original color, giving a way to detect fraud.

➤ JEWEL THIEVES and dishonest gem dealers may turn a new scientific development into a new way to cheat the public.

The scientific development is a new X-ray tube. It can be used to give gem stones a more valuable color. The buyer of diamonds treated with X-rays from the new tube might find the stones turning yellow. Some other gems given the X-ray treatment would fade in color or revert to a cheaper hue.

Developed by Machlett Laboratories, Springdale, Conn., the new X-ray tube has a beryllium window. This permits longer wavelength rays to get through than more conventional tube windows.

When gems are exposed to the rays, some of them take on new colors. Cheaper, yellowish diamonds look like more valuable stones.

Color Lasts in Dark

The color changes seem to last indefinitely in the dark at room temperature. But heat or sunlight will bring the gems back to their normal color.

Dishonest gem dealers could keep X-rayed stones out of the light until selling them. Only after the buyer had exposed the gems to sunlight or heat would the fraud become evident.

Reporting on X-ray treatment of gems with the new tube, Dr. Frederick H. Pough of the American Museum of Natural History in New York and T. H. Rogers of Machlett Laboratories warn against commercial hoaxes.

They suggest a fading treatment, exposing the gems to sunlight or heat, as the best way to detect X-ray jewel swindles.

The effect of X-rays or radium on gems has been known for some time, but the new tube makes the treatment quicker and more effective. Curiously enough, X-rays also are used by gem dealers to prevent one common type of fraud. X-rays can be used to show up fake diamonds and other imitation gems.

Writing in the American Mineralogist, Dr. Pough and Mr. Rogers report on a number of different stones treated with X-rays. Here are some of the color

changes in common gems which can be produced with X-rays:

White or pinkish sapphires become a brilliant amber color.

White topaz turns to brown-purple.

Pinked topaz changes to orange-brown.

Aquamarine beryl, normally pale blue, is made light green.

Dark green tourmaline takes on a dark rose-purple color.

Lilac kunzite is turned to green.

Not all gems changed color under X-rays in the experiments. Emerald beryl is still green after an hour's treatment, while opals show no color change after several hours of X-rays. Time required to alter the color of the stones which did change hues varied with the different kinds of gems.

The way X-rays change the color of gem stones is believed to be by knocking off negatively charged particles called electrons from the atoms or ions making up the crystal structure of the stone. All crystals are made up of rows of atoms or ions regularly spaced, but there may be some nooks or crannies in this construction.

When X-rays strike the gem, they may free electrons. The loose particles may slip into these crannies and give the stone a new color.

Heat and sunlight are believed to release the electrons again and send them back into their normal positions, bringing back the original color to the stone.

Science News Letter, August 23, 1947

AERONAUTICS

Flying Freight-Car

➤ ANOTHER flying freight-car is the subject of patent 2,425,498, assigned by its designer, Michael Watter of Philadelphia, to the Budd Company. The rear third of the fuselage cants upward to permit the approach of trucks. A trap-door-like ramp lets down to the rear, to permit them to drive up and in, if desired. When the plane is used in war, the ramp can be opened a crack in flight, functioning then as platform for one or more tail guns.

Science News Letter, August 23, 1947

HYDROPONICS

Food From Soilless Gardens

The Army's soilless farms are yielding millions of pounds of vegetables for the American occupation forces in Japan. Other hydroponic installations have been made.

➤ SOILLESS gardening is producing tomatoes, lettuce and other fresh things to eat by millions of pounds for American garrisons and occupation forces in Japan and other far islands. An Army Quartermaster Corps survey shows that the expected green-vegetable crops from all hydroponics installations will amount to more than 3,582,000 pounds. Nowhere else has this type of gardening ever been undertaken on such a scale.

Biggest installation is in Japan, where there is a 55-acre soilless "farm" at Chofu, near Tokyo, and another of 25 acres at Otsu, near Kyoto. Five acres of the Chofu installations are under glass—and that's major greenhouse operation in any man's gardening. These big projects are under the command of Lt. Col. E. W. Elliott, who had had previous experience in directing soilless gardening at the now abandoned pioneer establishment on Ascension island and at Atkinson Field in British Guiana. Other hydroponic installations now operating are on Iwo Jima and near Nanking, China.

First on Ascension Island

Soilless gardening was resorted to originally in such places as Ascension and Iwo because American soldiers like fresh salad vegetables and there wasn't any soil in which to grow them. It is being conducted in Japan and China because the unsanitary fertilization practices of Oriental agriculture make it unsafe to eat anything raw. All these places are so far from American ports that it is impracticable to transport fresh vegetables, either by refrigerator ship or by air.

Vegetables raised in all these soilless gardens have been reduced to a standard set of six: tomatoes, lettuce, radishes, cucumbers, onions and green peppers. The Japanese gardens are expected to produce 2,000,000 pounds of tomatoes alone. For production in the tropics, a very lucky stroke was the creation by plant breeders in the U. S. Department of Agriculture of a variety named "Slobolt", which will not go to seed when the weather is hot, as most kinds of lettuce do.

The type of soilless gardening or hydroponics adopted by the Army is known as gravel culture. Very long, shallow troughs of concrete or asphalt are filled with fine washed gravel, volcanic cinder or other inert material. Plants with their roots supported in this are watered at regular intervals with a solution containing fertilizer salts in a balanced formula. Solution running out at the lower end of a series of such troughs is caught in a sump, analyzed to determine what salts it has lost, and brought back up to standard for re-use at the next watering.

Production of vegetables by this method is admittedly not cheap. Cost accounting shows that some items, like lettuce and radishes, cost about twice the ordinary commercial production figures. On the other hand, hydroponic tomatoes cost only three cents more than commercial tomatoes: 19 cents as against 16. And cucumbers actually cost much less: four cents a pound as against 11 cents for commercially raised "cukes". Cost was highest on the pioneer establishment at Ascension island, which is strictly a desert island. There every pint of water used in the garden, and for all other purposes, had to be distilled out of sea water, with imported oil as fuel.

Costs in Japan are kept down, partly because there is plenty of natural water, but mainly because of the very high quality of Japanese help. High-ranking horticultural scientists eagerly assist Col. Elliott, and many of his "field hands" are graduate students from the universities who want to gain the "know-how" of this new American technique.

Science News Letter, August 23, 1947

AERONAUTICS

Inland Ports Planned To Promote Water Flying

➤ INLAND PORTS for flying boats, definitely included in a program of the U. S. Civil Aeronautics Administration, will extend water-flying across the continent. Lakes, rivers and flood-control and irrigation reservoirs will have a new use.

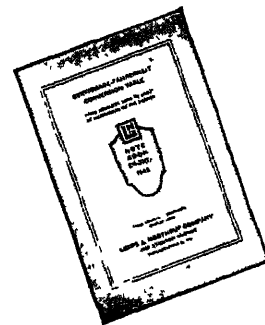
Approximately 250 major seaplane

bases throughout the United States are planned. The scheme is to have at least one such facility available to cross-country flying-boat pilots every 125 miles. In addition there are thousands of lakes that can be used for private flying.

The program is aimed at eliminating the biggest present stumbling block to the growth of seaplane flying, the Aviation Writers Association was told by Theodore M. Wayave of the CAA. Now, except for certain highly-developed regions of the country such as the Atlantic coast, seaplane pilots have few places to go where they can obtain adequate service, he stated.

The Federal Airport Act provides federal assistance in developing seaplane bases, and calls for 50-50 sharing of costs by the Federal government and local sponsors. Proper anchorage, docks for unloading, and facilities for re-fueling and servicing planes are necessities at the proposed flying-boat ports. Approach lights, and a traffic control system, would be needed at those with heavy use. The ports would require an average of \$10,000 to develop, Mr. Wayave estimates. Surveys are now underway.

Science News Letter, August 23, 1947



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AGRONOMY

NATURE RAMBLINGS

by Frank Thone



Hybrid Vigor Helps

➤ CORN has been taking a terrible beating this summer. First, a late, chilly, wet spring delayed planting, in places two or three weeks past normal time. Then more rain produced disastrous floods that drowned out millions of acres of rich bottom-land fields and slowed down growth on the uplands. Finally, after the surviving crop had used up the water left in the soil by the early-summer deluges, a month or more of pitiless drought and heat took further toll. Possibility of early frosts, to add to this job's calendar of woes, remains for us to worry about.

Nevertheless, it could have been worse. If Midwestern farmers had not been converted to the gospel of hybrid corn two decades and more ago, corn would not be standing up against its multiplied woes nearly as well as it is, and the yield from existing acreage would probably be from a fourth to a third less than can now be expected.

When Henry Wallace founded the first commercial hybrid seed-corn com-

pany, back in the early 1920's, he estimated that the then novel type of corn would produce a 10% higher yield per acre than the best open-pollinated corn then under cultivation. It appears that he was much too conservative; present-day agriculturists estimate the increase at 20% or better. This is based on growth under equivalent conditions in good seasons.

Furthermore, hybrid corn is commonly credited with being better able to withstand adverse growing conditions than the older type. It has greater over-all vigor, with stouter stalks and more prop-roots, enabling it to stay right side up under winds and rains that would cause weaker stalks to lean over and "lodge." Also, many strains of hybrid

corn are claimed to have superior drought resistance. Both these abilities to withstand unfavorable weather have been needed this year by all corn that survived early rains only to encounter drought.

Finally, if early frosts do catch much of the crop with its kernels still too moist, or "soft," for cribbing, at least some farmers may resort to the old practice of letting their fields stand unharvested until after the soil freezes, to give the ears more time to dry out, and then go in and pick the crop by hand. Here again the sheer mechanical ability of the stout, well-propped hybrid stalks to stand up against autumn winds will stand the corn in good stead

Science News Letter, August 23, 1947

AERONAUTICS

Jet Propulsion Progress

➤ PROGRESS in jet propulsion of aircraft is marked by three new planes which have now passed successful flight tests and are ready for large-scale production if needed. They are the six-jet Martin Army XB-48 high-speed bomber, the jet-plus-propeller Ryan Navy XFR-4 experimental interceptor fighter, and the Douglas Navy Skystreak, which is a research plane to explore speed-of-sound traveling.

The Martin XB-48 is the largest multi-jet bomber of conventional design ever built for the Army Air Forces and is the first six-jet plane ever completed. It has a speed of over 480 miles an hour and can carry a bomb load of more than ten tons. Its six General Electric jet engines produce 24,000 pounds of thrust.

The dimensions of this new plane are approximately 108 feet in wingspan, 86 feet in length and 27 feet in height. The wings are very thin to meet requirements for flying at high speeds. There are three engines in the under surfaces of each wing, placed a short distance away from the fuselage. Landing wheels are in tandem under the fuselage itself, because the thin wings would not provide housing for them.

The new Ryan plane is much like the company's production model FR-1 Fireball in general appearances but has vastly improved performance, particularly in climbing ability. In speed, it is in the 500-mile-per-hour class. Increased speed and climbing ability are obtained by the installation of the Westinghouse 24-C axial flow jet engine in the aft section. This is more powerful than the jet engine in the earlier ver-

sions. The front engine, that drives the conventional propellers, is the same, a Wright Cyclone

The Douglas Skystreak was designed to surpass the speed of any existing plane, and perhaps to beat the speed of sound, 761 miles an hour at sea level. It is powered with the General Electric TG-180 turbo-jet engine, similar to the powerplant in the Army Republic XP-84 which made an unofficial record of 619 miles an hour. In flight tests already made, the Skystreak showed itself to be maneuverable, stable and capable of great speed. Tests to approach the speed of sound have not yet been made. The plane, with wings of aluminum alloy and body of magnesium alloy, is claimed to be 60% stronger than any existing production aircraft.

Science News Letter, August 23, 1947

CHEMISTRY

International Chemistry Congress to Meet in U. S.

➤ THE TWELFTH International Congress of Pure and Applied Chemistry will be held in the United States in 1951, it was announced at the close of the eleventh Congress in London, first to be held since the war.

Dr. W. Albert Noyes, Jr., president of the American Chemical Society, said the 1951 meeting would probably be held in New York City.

Science News Letter, August 23, 1947

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ATOMIC ARTILLERY—James Stokley—*Gen Elec Res Lab*, 11 p, illus, paper, free "Who's Who" among the family of atom-smashers, a recapitulation of information concerning the cyclotron, synchrotron, betatron, synchrocyclotron, electrostatic generator, linear accelerator, etc

ELEMENTARY MEDICAL PHYSICS—Howard O Sterns—*Macmillan*, 354 p, illus, \$4.75 As well as containing the necessary fundamentals of physics, this text for nurses and pre-medical students points out the application of the laws of physics to the biological sciences and the operation and equipment of a hospital

FISHERY RESOURCES OF THE UNITED STATES—Lionel A Walford—*Publ. Affairs Press*, 134 p, illus, \$5 Up-to-date information concerning the aquatic resources of the United States for conservationist and sportsman, includes tabulations of fish found in different regions and localities

INDEX TO ASTM STANDARDS 1946—*Am Soc for Testing Mat*, 219 p, paper, free An adjunct to the Book of Standards to enable the standard specifications and

tests to be readily located

NATURALISTS' DIRECTORY—*Cassino Press*, 34th ed, 204 p, paper, \$3 Names, addresses and special subjects of study of professional and amateur naturalists of North and South America, a list of periodicals dealing with natural history and a list of museums

PROBLEMS AND PROGRESS OF FORESTRY IN THE UNITED STATES—*Society of Am Foresters*, 110 p, \$1.75 A report of the Joint Committee on Forestry of the National Research Council and the Society of American Foresters

PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL STRESS ANALYSIS—C. Lippson and W. M. Murray, eds—*Addison-Wesley*, Vol IV, No II, 121 p, illus, \$6

UNITED STATES NATIONAL COMMISSION FOR UNESCO Report on Mountain-Plains Regional Conference of UNESCO, Denver, Colo., May 1947—*U S Natl. Comm. for UNESCO*, 39 p, paper, free Essential features of the Conference, particularly a specific program of action agreed upon by its members

Science News Letter, August 23, 1947

Individual farmers with mechanical genius may be able to meet their own drying problems, especially if their farms are electrified. It may be possible to adapt the hay-driers already installed in many barns to the task of drying corn, or ducts with blowers may be arranged in existing corn-cribs

Finally, earlier practices may be resorted to, like letting the corn stand in the field until it dries and then hand-picking it after the ground is frozen, or stacking it in shocks until the ears dry. These methods are less economic than modern machine harvesting, but they can serve in a pinch. And the pinch is likely to come this fall.

Science News Letter, August 23, 1947

CHEMISTRY

Fabrics from Peanuts

➤ PEANUTS join the procession of protein sources used for the production of synthetic fibers and fabrics, in patent 2,424,408, issued to Sarah N. McGeoch of Greenford, England, and assigned by her to Imperial Chemical Industries, Ltd. The peanut globulin is extracted with strong alkali at moderately low temperature

Science News Letter, August 23, 1947

AGRICULTURE

Silos May Save Soft Corn

Artificial drying is being contemplated to help save immature corn stopped by the frost. Soft corn is economical feed for beef cattle.

➤ CORN STOPPED by frost in soft or immature condition can be salvaged by being put into silos, farm researchers point out. Soft ear-corn silage, tried out at the Iowa State Agricultural Experiment Station, was proved to be an economical feed for beef cattle, almost equalling normal shelled corn in value per acre, though not as valuable as regular corn silage.

In the experiments, steers were fed on the soft-corn silage as their main ration for 113 days. This was followed by a finishing period of 30 days on shelled corn and regular silage.

Department of Agriculture scientists, however, are not depending on silos to save the whole of the 200,000,000 bushels threatened with being left in soft condition by early frosts. Artificial drying of corn, hitherto not considered necessary on a large scale at least, is seriously contemplated for the first time in American farm history. A conference of federal and state agricultural engineers has

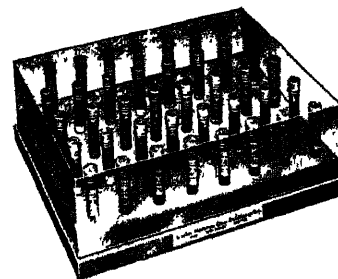
just been held at Purdue University, to bring the best existing "know-how" to bear on the problem.

There are some corn-driers in operation now, but they are for the most part large-scale, stationary machines used only in grain elevators. They will not solve the problem for farmers who wish to store their corn on their own premises. What is needed are mobile corn driers that can be tractor-hauled from farm to farm, or small-scale driers not too costly for individual farmers to own and operate.

A few machines of this type have been patented, and some of them built; but how many of them are ready for operation, or can be put into operation by first frost this year, is still uncertain. It is not even certain whether a machine built for use in one state, say Nebraska, would be useful in a state where moisture conditions are different, like Illinois or Indiana. The wetter corn in those states, subjected to too severe drying conditions, might be spoiled in the process.

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⚙️ **FIVE-IN-ONE TOOL** is primarily a screwdriver and a double-headed hammer. It has a crossarm, with balanced hammer heads on its ends, that slides along the screwdriver shank. When the crossarm is near the plastic handle, it helps to spin the tool; when near the blade, the tool becomes a tack hammer.

Science News Letter, August 23, 1947

⚙️ **BABY ANCHOR** holds a sitting infant safely in the bathtub. It consists of a three-legged device with rubber suction feet that holds an aluminum backrest against the youngster. A strap around the child and backrest hold him in place.

Science News Letter, August 23, 1947

⚙️ **"QUIETORIUM"** is a soundproof room for sound-testing household refrigerator compressors. It has soundproof walls, and is mounted on 50 steel coil springs set in a bed of cinders that keeps out earth vibrations. Within it, the human ear detects machinery operating sounds.

Science News Letter, August 23, 1947

⚙️ **LIQUID LOCKER**, for holding loosened rungs in chairs, loose handles on tools and many similar applications, enters the wood itself and causes expansion which does the holding. It is not an adhesive; it merely expands the wood fibers. It can be used to swell the wood in an enlarged screw hole.

Science News Letter, August 23, 1947



⚙️ **HIGH-POWER BINOCULAR**, for sportsmen and travelers, weighs about four ounces and is small enough to fit in the hand as shown in the picture. Its body is magnesium, and within is a Leman prism, a single piece of optical glass said to transmit more light than other two-prism systems.

Science News Letter, August 23, 1947

⚙️ **PRISMATIC street lamp** puts 40% more light on the roadway than earlier types, it is claimed. Because of the many prisms which comprise the glass globe,

the light is directed in two broad beams up and down the street.

Science News Letter, August 23, 1947

⚙️ **RADIO-TELEPHONE** for owners of small boats is portable, and has within the unit a battery that can be recharged at home with the usual house electric current. Having its own electric power, it can be used on craft without other electrical equipment.

Science News Letter, August 23, 1947

⚙️ **KITCHEN DISHTOWEL**, 20% asbestos and 80% cotton, wipes dishes faster and drier because asbestos has ability to absorb considerable quantities of water rapidly. Also the asbestos, which is a mineral, imparts a polish to china and glass.

Science News Letter, August 23, 1947

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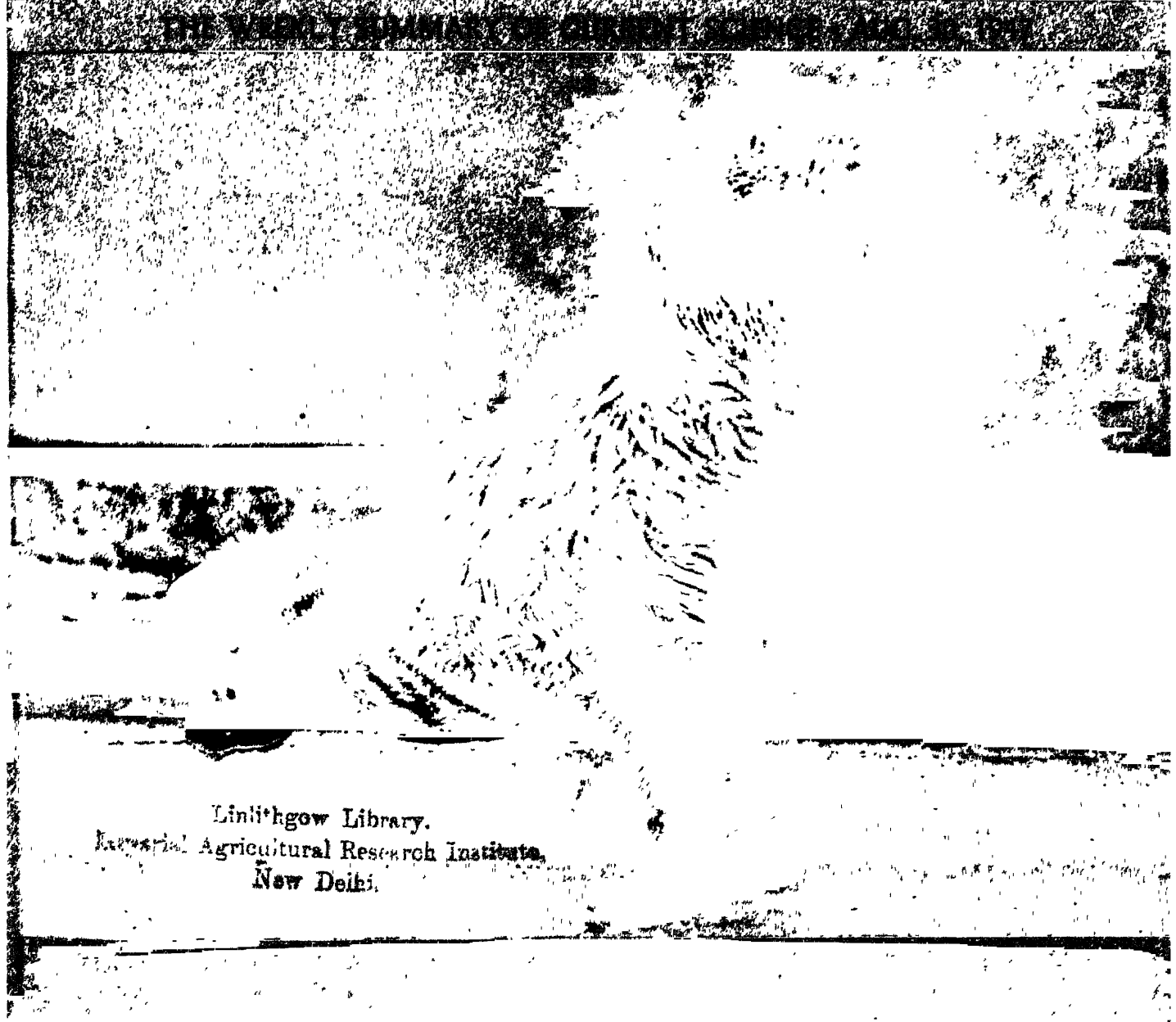
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SCIENCE NEWS LETTER



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ASTRONOMY

Red Star Secret Unfolded

Antares, star of mystery, consisting of a red member and a blue part, is at the heart of enormous cloud of iron particles. Iron is not gas.

➤ A GIANT red star deeply enveloped within an iron curtain has had its mystery pierced by an American astronomer, after seven years of ceaseless watching.

The star is Antares, that glows redly in the southern constellation Scorpio; it is sometimes called "heart of the scorpion." It really consists of two stars, a giant red member 450 times the diameter of the sun, and a much smaller, terrifically hot, blue globe that seems to consist mainly of helium.

The astronomer is Dr. Otto Struve, who is director of two observatories: the Yerkes observatory of the University of Chicago and the McDonald Observatory of the University of Texas on Mt. Locke. Since 1940 he has been waiting for

the perfect atmospheric conditions that would permit him to separate the light from the two close companions on his spectrographic plates.

When he finally did get this astronomer's dream of a perfect night, his plates showed an unexpected and astonishing result: Both red and blue members are at the heart of an enormous cloud of iron particles that has ten times the diameter of our solar system. Furthermore, he reported to *Science* (Aug. 15), their light indicates that the iron is not in gaseous form, but exists as extremely minute solid particles, resembling the meteors or shooting stars familiar nightly in the earth's upper atmosphere.

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flower is the carrier of the virus of celery mosaic disease. If the celery fields were sprayed when the crop was in, the celery would be killed, too. So the fields are sprayed well in advance of setting out the crop, to kill the day-flower. After the 2,4-D effects have had time to wear off it is safe to put in the celery, which then stays free of mosaic.

Out West, experience in ridding lawns, parks and golf courses of weeds with 2,4-D is being put to account in obtaining cleaner grass seed for re-establishing depleted rangelands. 2,4-D'd before blossoming-time, the seed plots are free of broad-leaved weeds, and hence have nothing but grass seed to offer.

2,4-D may prove useful directly on the range, to get rid of such unwanted growths as loco-weed, creosote bush and sagebrush, that take up land that could be profitably growing grass.

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VETERINARY MEDICINE

Worm-Killing Chemical Remedy for Brucellosis

➤ PABA, a chemical that has been used with considerable success in ridding livestock of parasitic worms, has now been found to have a sulfa-like action against the exceedingly minute germs called *Brucella*, that cause contagious abortion in cattle and undulant fever in human beings. This new usefulness of an old drug was described by Drs. Cornelia M. Cotton and Robert E. Swope of the University of Maryland, before the meeting of the American Veterinary Medical Association in Cincinnati.

PABA, which is shorthand for para-aminobenzoic acid, was effective against the *Brucella* organism both in glass laboratory vessels and in the living bodies of animals. If too little of the drug was given, the germs were only stimulated and encouraged. But when the dose was increased, it at first checked their growth, then killed them outright. In some tests, PABA was first injected into the bodies of guinea pigs, followed by one and one-half billion virulent *Brucella* organisms. Even such a massive invasion of the germs was able to accomplish nothing; at the end of five weeks no trace of them could be found in the animals' bodies.

Unlike some germ-stopping drugs, PABA seems to produce little toxic effect on the animal under treatment, even when they continue to receive the drug for several weeks.

Science News Letter, August 30, 1947

AGRICULTURE

2,4-D Only Begun To Fight

"Chemicultivation" with 2,4-D has saved corn and work too. Weed-killer may make closer spacing of corn plantings possible. Other crops have benefitted also.

➤ ONE of the most spectacular uses of 2,4-D this year has been the rescue of thousands of acres of corn, in fields so wet from the June-July deluges that it was impossible to kill their weeds by conventional methods of cultivation. Farmers, desperate in the face of threatened losses, gambled with the new spray method of cultivation—and won, in the highest corn market in history. In most places they sprayed just once, but that once was sufficient. Broad-leaved weeds went down, while corn, being a giant grass and hence immune to 2,4-D effect, stayed up and is making a crop.

At state experiment stations all over the country agronomists are ringing the changes on this new method of "chemicultivation." If one spraying will "lay by" corn that used to require three or four cultivations with steel-bladed implements, that will break a farm-labor bottleneck. At present, corn must be cultivated just at the time the hay harvest is prime, and when a few days en-

forced idleness due to rain may raise very hob with the farm work schedule.

Another vista opens up before the eyes of 2,4-D enthusiasts. At present, the spacing of corn plantings is determined more by the requirements of cultivation machinery than by the growing needs of the corn plant itself. One of the things that agronomists at the experiment stations are trying to find out is whether corn can be planted much closer together, perhaps with heavier fertilization, spray-cultivated once before the seed germinates, and then left to bear a heavier harvest. If this hopeful scheme works out it will be the most revolutionary thing that has happened to corn since the commercial introduction of hybrid varieties.

But corn is not the only crop to benefit from 2,4-D. This murderous chemical can be used to benefit crops that aren't even there. Such a paradox has arisen in Florida, where a blue-flowered creeping weed known as the day-

BIOCHEMISTRY

Anti-Germ Body Chemical

Histamine fights germs invading the body by activating the cells that eat the disease-makers. This protein has decisive role in germ battles.

► THE "DECISIVE" part in some of man's battles against disease germs is played by a body chemical called histamine. Studies leading to this conclusion are reported by Dr. Miklos Jancso, of the University of Szeged, Hungary, in *Nature*.

In the war against germs, certain cells of the body do their job by swallowing or eating the invading disease germs. These germ-eaters are called phagocytes.

Histamine, Dr. Jancso finds, transforms certain cells of the body from their resting state into active phagocytes or germ-eaters.

The phagocytes swallow or engulf other things besides disease germs. Among such things is India ink. Dr. Jancso used this in his studies. He painted a solution of histamine on the skins of rats and then injected India ink into their veins. The histamine-smear areas showed gray spots.

"One can indeed 'write' with histamine on the skin," he describes it

The histamine transformed the resting cells into phagocytes which then ate up the India ink just as they would eat up disease germs.

If mice and rats are given daily injections of histamine in gradually increasing doses, their bodies develop tolerance for the chemical. Then it no longer activates phagocytes. The histamine-activating effect can also be checked by preliminary treatment with an anti-histamine chemical. Dr. Jancso used one called antistine. There are many of these and some have been used in treatment of hay fever and other allergic disorders, on the theory that allergies are due in part to overproduction of histamine by the body.

As the activator of the phagocytes, histamine, Dr. Jancso contends, "takes a central role in the defensive and recuperative" reactions of the body.

Science News Letter, August 30, 1947



LIFE - SAVING EQUIPMENT —

The backward projecting points on the line-carrying projectile anchor it in the ground when it strikes, giving a firm hold to the cable which has been unwound from the large reel shown.

The rocket-firing equipment can be carried as standard equipment aboard ship. This would make it possible for a wrecked vessel to throw its own line to shore and save its own passengers and crew without waiting for shore aid.

The same ship-borne equipment can be used at high sea to cast a life-line to a neighboring vessel, or to get a tow-line to a disabled ship. The equipment can assist bridge builders in spanning deep chasms and rivers. There is a special job for it in fire rescue work. The reels are made by Intertype Corporation, Brooklyn, N. Y. The inventor is Wadsworth W. Mount, Summit, New Jersey.

Science News Letter, August 30, 1947

INVENTION

Rocket for Life-Saving

► A FORWARD step in coastal life saving has been taken with war-born equipment used to shoot telephone wires across wide rivers. It is a method in which steel cables, by use of rockets, are thrown from shore to stranded vessels, or from the vessel to shore, to serve as life-lines.

The equipment for this purpose, while basically similar to that used in the war, contains important improvements. One is its reel from which the cable is "cleanly" played out; another is a line-carrying projectile which can anchor the end of the line when it hits its objective.

Standard reels carry either 500 or 1,250 feet of cable, one-eighth inch in diameter, which has a breaking strength of 2,000 pounds. Cables from several reels can be connected so that when the line on the first is played out the line on the next follows.

Cables of other sizes and strengths

may be used. In one test, in which Navy rocket motors were used, a quarter-inch cable was stretch a distance of 1,171 feet. This cable had a breaking strength of 7,000 pounds.

The projectile to which the line is attached is called a "stake ground anchor." Its pointed end permits it to penetrate deep into the earth where it is held firmly embedded by two backward-projecting spurs on its side.

This new equipment has many advantages over the well-known and long-used method of shooting rope from cannon on the shore over a wrecked vessel. Its aim is more accurate. The speed and the light weight of projectile and line make it less affected by wind. The steel cable used need be only one-third as heavy as a rope of equivalent strength. With it, there is no need of throwing first a light line by means of which the supporting rope is pulled out to the ship.

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BIOLOGY

Nine Kinds of Mold Work Toward Ruin of Soft Corn

► MUCH CORN that succeeded in running the gantlet of early floods and later drought will have to face a third hazard after harvesting. Because early frosts may catch it still "soft," that is, with high moisture content, it is apt to spoil through molding in the storage bins.

What happens when molds' attack corn has been the subject of research by Dr. C. M. Nagel and Dr. George Sem-

eniuk working at Iowa State College.

They began by finding out what kinds of molds were at work on corn spoiling naturally. They were able to isolate nine distinct kinds: four of *Penicillium* (though none of the species that produces penicillin), four of the closely related *Aspergillus*, and one black bread-mold, or *Mucor*.

After culturing each kind separately, they inoculated flasks of sterilized corn of 32% moisture content with spores of each mold. Four of the molds—two *Penicillia* and two *Aspergilli*—prove most destructive to the corn solids. Any

one of them would devour between 40% and 45% of the organic matter in corn in a four-week period. At the same time, the water content of the spoiled corn increased.

Another effect of mold spoilage is an increase in the amount of fatty acids present. These are the acids characteristic of rancidity in spoiled fats and oils. Some of this increase in fatty-acid content in moldy corn is due to the breakdown of the natural corn oil, but part may be due to direct production of fatty acids by the molds themselves.

Science News Letter, August 30, 1947

VETERINARY MEDICINE

Guard Public Health

Veterinaries discuss some of the dangers, including the *Salmonella* that cause food infection. Alert meat and milk inspection can avert community ills.

➤ **SAFEGUARDING** the public health makes demands on veterinarians as well as on public health officials and medical practitioners who serve human patients. At the meeting in Cincinnati of the American Veterinary Medical Association, various problems involved in the health interrelationships between man and his animals came up for discussion.

Among the threats to human health from diseased animals, some of the worst come from the small but hard-to-defeat group of germs known as *Salmonella*. Dr. Arthur H. Wolff of Lansing, Mich., told of these. *Salmonella* can cause food infection, producing typhoid-like diseases. Such infections are especially likely to occur in meat from sick animals; alert veterinary inspection can head them off.

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Practitioners Can Help

➤ **PUBLIC HEALTH** can be served not only by the veterinarian on the public payroll; it can and should be the concern of the private practitioner making his rounds, urged Dr. C. S. Bryan of Michigan State College. He is in especially good position, the speaker asserted, to promote rural public health, particularly in his recommendations regarding disposal of sick animals.

Above all, Dr. Bryan declared, the practicing veterinarian should safeguard the sources of milk: "In my opinion, the sanitary production of milk is just as

important to the veterinarian as is the control and treatment of animal disease, and experience has demonstrated that the dairyman and the community appreciate and are willing to pay for this service."

Science News Letter, August 30, 1947

Chickens Germ Smugglers

➤ **ANOTHER PLACE** where the veterinary must maintain close watch, stated Dr. P. J. Brandly of the U. S. Department of Agriculture, is the poultry market. Chickens and other birds that man eats almost seem to be especially designed to smuggle germs into him. Dr. Brandly listed by name an even dozen causes of disease in man that can be carried by poultry, to which he added "and 43 paratyphoid organisms which have been isolated from both man and birds."

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Where Does Vet Fit In?

➤ **SELECTING** the proper niche for the veterinarian in a well-rounded public-health setup will have much to do with his effectiveness afterwards, Dr. Martin D. Baum of Los Angeles pointed out. The U. S. Public Health Service has established a special branch for him, the Veterinary Public Health Section; the speaker expressed the hope that this pattern might be followed at state and municipal levels.

He recommended also that diseases of animals transmitted to man be made reportable, with special effort to indoctrinate both veterinarians and public health officers in the importance of such reporting.

Science News Letter, August 30, 1947

NUTRITION

Best Buys in Vegetables

➤ **THEY MAY NOT** taste best to you, but the best buys in vegetables these days are carrots and Hubbard squash.

They are inexpensive and each furnishes eight nutrients. That is more for your money than other vegetables, according to home economists at Cornell University.

Science News Letter, August 30, 1947

SCIENCE NEWS LETTER

Vol. 52 AUGUST 30, 1947 No. 9

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year, two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

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VETERINARY MEDICINE

Steps To Control Rabies

Federal control commission to take responsibility of activities to check rabies. Methods based on scientific information can be adopted.

► **FIRST STEPS** toward a federal rabies control commission are being taken by the U. S. Public Health Service with the cooperation of the Alabama and Georgia state health departments, it appears from a report to the American Veterinary Medical Association meeting in Cincinnati.

The commission would be composed of members from the U. S. Bureau of Animal Industry, the U. S. Public Health Service and the U. S. Fish and Wildlife Service, according to the plan outlined by Dr. Ernest S. Tierkel of Montgomery, Ala.

"Eradication of rabies is not possible in this country unless a properly authorized national agency assumes the responsibility of coordinating rabies control activities," he declared.

With a commission such as he described, a uniform pattern of rabies control methods based on proved scientific information can be drawn for adoption and action by the states. The commission could distribute to the states the best accepted procedures for diagnosing rabies. It would institute an accurate system of reporting rabies and keep local authorities posted on the most effective methods for immunizing, or vaccinating, against the disease. It could also prepare and distribute material for the education of the public on the problem.

In Alabama and Georgia epidemiologic studies are being started. The object is to form a basis for field demonstrations, on a county or multi-county health unit level, to evaluate various methods of controlling rabies. Mass vaccination of dogs, incarceration and impounding of strays, quarantine of exposed animals and concentrated trapping programs in areas where fox rabies exists are the methods to be tested.

Studies of another kind are under way at the U. S. Public Health Service's communicable disease center at Atlanta. Here scientists are experimenting to determine the length of time the commercial dog vaccines give protection against rabies. They are trying to re-

fine the system of dosage to get the best results. They are testing the safety and relative effectiveness of newly developed vaccines from live rabies virus such as vaccines from virus grown on chick embryos. The effectiveness of experimentally killed virus vaccines, including those made from rabies virus weakened by ultraviolet light and others inactivated by mustard-gas chemicals, is being tested.

Science News Letter, August 30, 1947

PALEONTOLOGY

Smithsonian Finds Skulls Of Ancient Stick-In Muds

► **THIRTY-FIVE** members of an Oldest Inhabitants Club in what is now New Mexico were such stubborn stick-in-the-muds, some 150,000,000 years ago, that they died because they wouldn't (or couldn't) come up out of the wet.

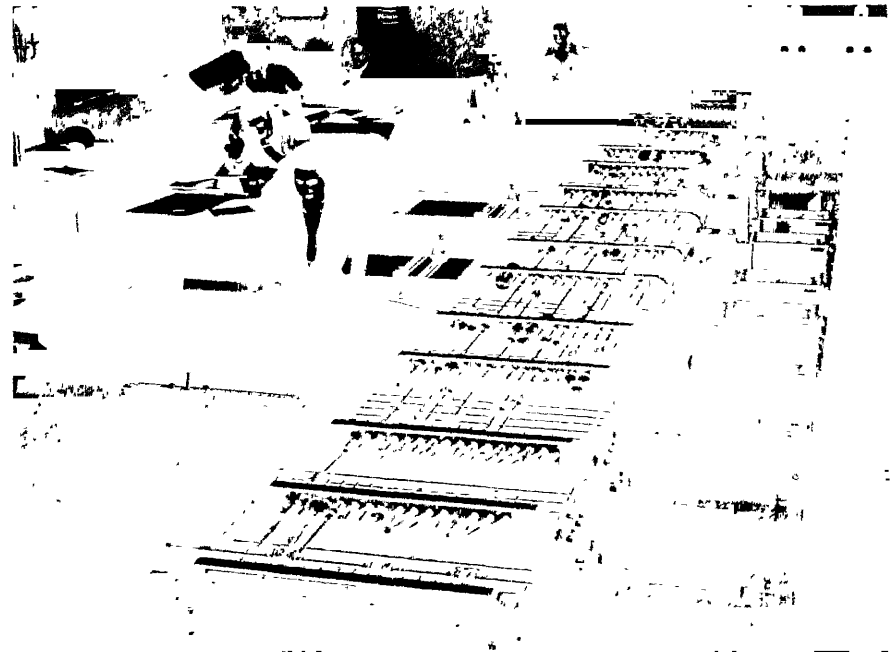
Now they are museum pieces: their skulls have been brought to Washington by Dr. D. H. Dunkle, who is paleontologist at the Smithsonian Institution.

The big find of ancient remains represents the highest type of vertebrate life known on earth during the transition period from the Age of Fishes to the Age of Reptiles. They were giant amphibians known scientifically as stereospondyls, relatives of the salamanders and mud-puppies of today. Their great size is indicated by the length of their skulls—two feet is not uncommon.

Dr. Dunkle states that in one slab of stone 40 feet square he found nine of these big skulls. Apparently the animals were caught in a drying pool and had no means for escape, since they were dependent on water to keep their scaleless skins moist.

During the Triassic Age, in which these creatures lived, a great part of the earth was apparently low and marshy. When geologic revolution set in, heaving up mountains and drying up the marshes, the more progressive reptiles, which could live on dry land, inherited the earth, while the giant amphibians perished.

Science News Letter, August 30, 1947



MATH BY MACHINE—This differential analyzer has accomplished in two weeks computations equal to 17 man-years of effort. Although the machine operates mechanically, it is electrically controlled. It has become part of the "figure center" at U. C. L. A.

AERONAUTICS

No Personal Jet Planes

Some jet engines may be used on commercial planes 10 years from now, but private planes will still have propeller-type engines.

► **HIGH-SPEED** jet planes may continue to break the speed records, but your own personal plane of 1957 will probably still use the familiar propeller-type reciprocating engine. This is the prediction of E. S. Thompson, aviation official of the General Electric Company.

Some jet engines will be used on commercial planes a decade from now, the aircraft engineer believes. But ten years from now he forecasts, military planes still will be the main users of the new high-speed propulsion units.

Large commercial planes and bombers will use jets, as will military pursuit planes. Rockets may be used on some pursuit planes, but the main use of rockets and the "flying stovepipe," ram jet, will still be on missiles and aircraft without human crews.

Here is the way aircraft will be powered in 1957, as foreseen by Mr. Thompson: Small personal planes and feeder line commercial craft will still use reciprocating engines. Some executive type or business planes will have the so-called "prop-jet," with a gas turbine engine driving propellers.

Medium-range commercial engines will have turbosupercharged engines and a few may have the prop-jet. Medium-sized, long-range commercial planes will use a compound engine and some turbo-jets, while the larger commercial aircraft will use prop-jets and some turbo-jets.

Military aircraft will use more jets. Medium-range bombers will have turbo-

jet engines while longer range bombing craft will probably have compound engines, with the largest using prop-jets. A few may have turbo-jet engines. Pursuit planes of a decade from now will have turbo-jets and some rockets.

The reason jets will not be used on your personal plane of a decade from now is a matter of economy, Mr. Thompson explains in the *Coast Artillery Journal* (July-Aug.). Increased costs of several jet types of engine will not be practical for small, irregularly-used personal planes. Turbo-jets are inefficient at speeds below 400 miles per hour, and rockets are out of the question, even for assisting take-offs, because of high speeds and extremely high fuel consumption.

Jets will become increasingly common in planes, but if you buy a personal plane in 1957, you will probably find it has today's conventional type of engine.

Science News Letter, August 30, 1947

PHYSIOLOGY

Vitamin C Needed For Adaptation to the Cold

► **FOR THOSE** who have pulled out of the heat wave enough to start thinking about winter weather problems, here's a tip: vitamin C, the orange, lemon and tomato juice vitamin, will help your body get used to and withstand severe cold.

The winter weather tip comes from studies by Drs. Louis-Paul Dugal and Mercedes Therien of Laval University

in Quebec. Both rats and guinea pigs were used in their studies. Guinea pigs, like man, depend on food for their vitamin C. Rats, unlike humans, can make it in their own bodies.

The amount of vitamin C in the body tissues of rats kept in the cold, between about 24 and 39 degrees Fahrenheit, increased as much as 80% over the amount in the tissues of rats kept at room temperature. So the rats evidently made more vitamin C to help their bodies adapt to the cold. Rats dying in the cold have a very low content of the vitamin in their tissues.

The guinea pigs, more than 600 of them, were divided into nine groups. Each group got a different sized daily dose of the vitamin. Half of each group was kept at room temperature, the other half in the cold. The ones at room temperature all behaved in the same way and all thrived. But the only ones able to adapt to the coldest temperature (about 17 degrees Fahrenheit), were the ones that got the largest daily dose of the vitamin. This dose was 150 times the daily dose needed to prevent scurvy in the animals.

The groups of guinea pigs were eliminated or lost weight one by one as the temperature was lowered, according to the amount of the vitamin they were given.

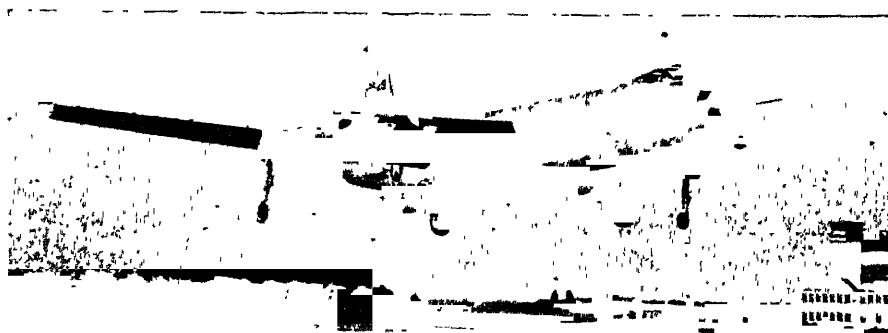
A relation between adaptation to cold and the amount of vitamin C in the animals' body tissues, particularly the adrenal glands, was observed. This, together with work by other scientists, suggests that vitamin C is beneficial to all animals unable to make the vitamin in cases where the response of the animal to some sort of stress involves activity of these glands. The stress may come from intense work, poisonous substances and other damaging agents that cause an "alarm reaction" in the adrenal glands.

Details of the vitamin C studies are reported in the *Canadian Journal of Research* (June).

Science News Letter, August 30, 1947

Spain, Italy, Greece and Portugal are the principal olive-producing countries in Europe in the order named; Europe is responsible for 85% of the world's supply of olive oil.

At the present rate the U. S. Civil Aeronautics Administration will have the country blanketed in two to three years with very high frequency (VHF) radio communication and radio ranges replacing the low-frequency type.



MARTIN XB-48—This is the largest multi-jet bomber of conventional design ever built for the Army Air Forces. It has six jet engines.

MEDICINE

War Provides Remedy

Poison gas made in England for war use, discovered to have useful role against paralysis of the intestines, declares president of British Association.

Scientists gathered this week in Dundee Scotland, for the first time since the beginning of the war, for the meeting of the British Association. This is the first report received from the gathering.

➤ AMERICAN scientists have found an "invaluable remedy" for a dangerous paralytic condition in a poison gas made in England for war use, Sir Henry Dale declared in his presidential address to the British Association for the Advancement of Science meeting in Dundee, Scotland.

The condition is the paralysis of the intestines which sometimes follows an abdominal operation and may even kill the patient. Intestinal paralysis is also sometimes a complication of infectious diseases such as pneumonia.

Discovery of this useful role for the poison gas was made by Prof. A. M. Harvey and Drs. D. Grob, J. L. Lilienthal, Jr., and B. F. Jones of the Johns Hopkins Hospital and Medical School.

The chemical is known as DFP, short for di-isopropylfluorophosphate. English scientists first made and studied it because they knew a series of chemically related poisons were under trial in Germany as potential weapons of chemical warfare.

Scientists of the U. S. Chemical Corps at Edgewood Arsenal and civilian doctors at the University of Pennsylvania reported more than a year ago that DFP might be useful in the serious eye disease, glaucoma, and in the muscle weakness condition, myasthenia gravis.

Its use for intestinal paralysis has only just been reported. It has been given to almost 100 patients with this condition and the surgeons using it are very pleased with it.

Doctors using it, however, are warned by the Hopkins group to remember that it is a poisonous substance and must be used with great care.

DFP produces its many effects by destroying a body chemical called cholinesterase. This body chemical, called ChE for short, plays an important role in relation to the transmission of nervous effects. There are other chemicals, such as neostigmine, which can check ChE activity for a short time, but they do

not destroy it as DFP does.

DFP not only causes a tremendous activity of the stomach and intestines but sensitizes the gut to other substances, such as neostigmine and pitressin. Patients with intestinal paralysis which is not helped by neostigmine or pitressin can be given a dose of DFP and then further doses of neostigmine if necessary.

In spite of this and other examples of practical peacetime results of wartime scientific research, scientists must beware, Sir Henry warned, of continuing "the spendthrift habit in research, the policy of trading for quick returns which six years of war experience may so easily have fostered and may even have made congenial to many of us."

Political and administrative activities of scientists may be a dangerous waste of their talents, he warned.

"The building up of our scientific capital of fundamental knowledge by those who have the creative gift should," he declared, "have prior claim over its practical exploitation and over any cultivation of its political influence."

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CHEMISTRY

New Soapless Soap Kills Germs Without Excess Suds

➤ SOAPLESS SOAP that kills germs efficiently in the washing machine and yet doesn't produce excessive suds to prevent cleansing action has been invented.

Cleanliness in laundry work is increased by the new chemical attack on the dirty clothes problem, reported to the Eleventh International Congress of Pure and Applied Chemistry, which has just been held in London.

Bacteriological cleanliness is now achieved by washing with strongly alkaline chemicals, but they are bad for the clothes. Some of the new ammonium compounds used as detergents are good wetting agents and disinfectants, but build up so much foam that it interferes with the operation of the washing machine.

Drs. J. C. L. Resuggan and J. G. Davis, British chemists, reported to the

meeting their solution of the dilemma by remaking the chemical structure of the detergent. Ammonium compounds heretofore used have been formed of long chains of 12 to 18 carbon atoms.

"It has now been found," Drs. Resuggan and Davis state, "that by substituting for the single long chain two shorter chains in a quaternary ammonium compound, ability to form stable foams in all but relatively high concentrations is destroyed, while, when suitable chains are used, the compound has considerable bactericidal and wetting powers."

The new compounds, with or without addition of a mild alkali instead of the present strong ones, are expected to kill germs better, help get the clothes cleaner, and avoid too much suds. Patents on this type of compounds have been applied for.

Science News Letter, August 30, 1947

PHOTOGRAPHY

Exposure Meter Described As Having a "Memory"

➤ A NEW photographic exposure meter, described as one having a "memory," is now in production by the General Electric Company. It is for use by both amateurs and professional photographers, and can be used with movie cameras.

The device enables photographers to determine proper exposures under varying lighting conditions. It is a photoelectric type. The makers say that it contains among its many features a pointer-locking mechanism, which "remembers" the light seen by the photocell; a louver-coupled dial, which "remembers" to shift the meter, automatically, from high light to low and back again as the scene requires; and the trident analyzer, which "reminds" the photographer to check the range of light on the subject.

Basically, every photoelectric exposure meter includes a light-sensitive cell, an indicating instrument, and some form of calculator for interpreting the instrument reading in terms of shutter speeds and f-stops. These are the sizes of various diaphragm openings. In the new meter, these various elements are so synchronized that it is not necessary to read the light scale, except under special conditions.

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America's record crop of corn in 1946, the largest in history, was due largely to the hybrid seed now planted and to an increased use of commercial fertilizer.

PHYSICS

Extreme Low Temperatures Obtained at Rutgers

➤ A TEMPERATURE of roughly 456 degrees below zero, Fahrenheit, was obtained at Rutgers University in a trial run of a new helium liquefier, it has been revealed. This is less than four degrees above what scientists call absolute zero, the point where matter contains no heat. A temperature of minus 458 is expected to be reached later.

The complicated machine, called a Collins helium cryostat after its designer, Dr. Samuel C. Collins of the Massachusetts Institute of Technology, works somewhat like the ordinary household electric refrigerator. Highly compressed gas is forced through a tiny jet. The cryostat, in addition, makes the helium gas used in it operate a piston-driven engine as another means of cooling the gas.

Other machines to reach temperatures approaching absolute zero have been designed and are in use. The device to be used at Rutgers will be employed in studying the fundamental structure of matter. It is expected to be used in exploring such things as the magnetic properties of the atom and the atom's nucleus.

Helium, the non-combustible gas used to inflate American balloons, is employed in this device because it becomes a liquid at a lower temperature than any other gas. Its liquefaction point is approximately 452 degrees below ordinary Fahrenheit zero, or about eight degrees above absolute zero.

Science News Letter, August 30, 1947

BIOLOGY

Germ Warfare Advances More Potent than A-Bomb

➤ ADVANCES in biological warfare have made the atomic bomb all but obsolete.

This is the opinion expressed by Dr. Brock Chisholm, executive secretary of the Interim Commission of the World Health Organization. Questioned at the Summer School of the World Federation of the United Nations Associations in Geneva, Dr. Chisholm remarked:

"Biological warfare has developed much more potency than the atomic bomb. Now continents could easily be wiped out."

He explained that armies, navies, and huge war plants are in effect relegated to no importance by frightful new biological weapons.

"The tiniest country now has the same war potential as the largest," the World Health Organization's executive secretary said. "All that is needed is an expert biologist with a laboratory and a small group of technicians. Methods of survival of 10 years ago are outdated. Efficiency in killing has outreached all types of defensive weapons. The old concept of new weapons producing counter weapons is no longer valid and there is no foreseeable way of coping with biological warfare. However, it should be remembered that those employing biological weapons could themselves become their own victims."

Dr. Chisholm said that the Interim Commission of the World Health Organization had thus far not considered the question of biological warfare. He explained that the United Nations' Security Council was charged with warfare matters but added that the World Health Organization might be called on for advice at a later date.

Science News Letter, August 30, 1947

CHEMISTRY

Germanium Used to Make Special Optical Lenses

➤ CHEMICAL ELEMENTS that used to be merely symbols on a classroom chart are one by one being drafted into industrial uses. Beryllium alloys are becoming familiar on the tool-bench; suburban gardeners push wheelbarrows and lawnmowers made largely of magnesium; uranium dominates the turbid politics of a shuddering planet.

Germanium, an element something like silicon discovered only two generations ago, now claims its place in the sun of science. Quite literally: its usefulness is in a new optical glass developed by a Chinese-born chemist in the research laboratories of the Eastman Kodak Company at Rochester, N. Y., Dr. Kuan-Han Sun. He has substituted germanium oxide for its familiar chemical analog silica (sand), in a formula including also titanium oxide and sodium fluoride, to obtain a glass with high refractive index, that should be especially useful in wide-angle camera lenses and microscope objectives.

Since current market price for germanium oxide is between \$30 and \$40 an ounce, immediate use is likely to be limited to special lenses. U. S. patent 2,425,403 has just been issued on the new fluogermanate glass.

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IN SCIENCE

ENTOMOLOGY

Mosquitoes Grow in Trees In Northern South America

➤ MALARIA mosquitoes grow in trees on the cacao plantations of northern South America. This is no Munchausen tale of their building nests like birds or clambering around like monkeys. It is a serious report of a mosquito-control problem brought back to the U. S. Department of Agriculture by H. H. Stage, lately returned from a tour of investigation in the Caribbean area.

When planters arrange to set out a new cacao grove they first clear away all the jungle vegetation. Then, to shelter cacao trees, which like a certain degree of shade, they interplant a taller tree species, known locally as *immortelle*.

Bromeliads, or air plants, roost by thousands on the branches of these shelter trees. They are small plants of the pineapple family, and in the cuplike cavities at the bases of their curved, stiff leaves they catch and hold rain water. These minuscule ponds afford breeding places for one species of malaria mosquito, *Anopheles bellator*.

It is not practicable to attack these treetop mosquito nurseries with DDT, but planters in the British island of Trinidad have found a practicable solution for the problem. They use a powerful spray-pump to apply a dilute solution of copper sulfate to the air-plants. This kills them without harming either the cacao trees or their taller sheltering companions.

Science News Letter, August 30, 1947

ENTOMOLOGY

Oklahoma Ground Cherry Yields Good Fly Poison

➤ AN OKLAHOMA plant, commonly known as the smooth ground cherry, yields a chemical which is a good fly poison, Dr. Loyd E. Harris of Ohio State University College of Pharmacy reported at the meeting of the American Pharmaceutical Association in Milwaukee.

The technical name of the fly poison plant is *Physalis mollis*. Its anti-fly chemical is probably an alkaloid.

Science News Letter, August 30, 1947

E FIELDS

ZOOLOGY

Costly Fur Coats Displayed by Zoo

See Front Cover

► FOUR rare and expensive fur coats have arrived at the San Diego Zoo. The coats are being worn by their owners, a quartet of northern fur seals, the only ones in any zoo.

The four seals were donated to the zoo by the Fish and Wildlife Service for close-range study by scientists. Biologist William H. Sholes brought the precious cargo from St. Paul Island in the Pribilof group off Alaska.

Zoo personnel are going to keep the seals under close observation. Day-to-day study of the animals in the zoo will supplement the field observations of government scientists seeking more knowledge about the native life of this valuable species of fur coat.

Science News Letter, August 30, 1947

MEDICINE

Penicillin Successful For Babies' Sore Eyes

► THE SILVER NITRATE drops now routinely put into the eyes of newborn babies as prophylaxis against gonorrhea and other eye infections may be replaced by penicillin.

Success with penicillin eye drops and advantages of the mold chemical over the silver compound are reported by Dr. H. Charles Franklin of the University of Tennessee College of Medicine in the *Journal of the American Medical Association* (Aug. 9).

Ophthalmia neonatorum, meaning inflammation of the eyes of the newborn, is the condition for which the German obstetrician, Crede, first used silver nitrate as prophylaxis. Until recently, doctors used this medical term, and the layman used the term, "babies' sore eyes," to mean the inflammation due to gonorrhea which the baby got from its mother. Now the term is applied to all inflammation or soreness with pus in the eyes within two weeks after birth. The germs of gonorrhea are the ones demanding most attention from the standpoint of preventing blindness. But pneumonia germs and perhaps

others which can get into newborn babies' eyes may be as damaging.

Penicillin checks these germs and the soreness of the eyes as well as silver nitrate does, Dr. Franklin found in a study of 1,710 infants. The mold chemical has the advantages of not being painful or irritating and of being safe so far as damage to the eyes is concerned.

Science News Letter, August 30, 1947

ORNITHOLOGY

Geomagnetism, Earth-Spin May Guide Homing Pigeons

► Are aviators about to take lessons in navigation from birds, as they originally took lessons in flight and soaring? Are ornithologists about to learn how homing pigeons find their way back home, and how migratory birds hold to a true course on night flights?

These questions are raised anew by a report given at the General Electric Forum, by Prof. Henry L. Yeagley of Pennsylvania State College, on the curious behavior of homing pigeons under his care during experiments for the Army Signal Corp.

Taken west of a certain midway point, the birds always flew to one spot in the state of Nebraska, instead of back to their home loft. Geophysical investigation showed that this western spot possessed the same intensity of earth magnetism, and also moved at the same rate as the earth turned on its axis.

Prof. Yeagley suggests that pigeons, perhaps birds in general, can sense these two things that we human beings do not feel, and that when taken away from home they fly in the direction that takes them towards the combination of geomagnetism and earth-spin to which they are used. They probably do not feel the earth's magnetism directly, he thinks, but do perceive differences in their own electrical state induced by flying across changing lines of magnetic force.

If Prof. Yeagley's hypothesis is valid, it might help explain a number of reported anomalies in bird behavior, such as the reported confusion of homing pigeons when in the neighborhood of radio towers, their inability to orient themselves when small but strong magnets are fastened to their legs, and the wild breakup of flights of ducks when radar beams were "squirted" at them by wartime experimenters.

Science News Letter, August 30, 1947

ASTRONOMY

Historic Telescope Is Being Sent to China

► AN HISTORIC American telescope is being sent to China's Sun Yatsen University Observatory in Canton.

The telescope is the 11-inch Draper refractor telescope of the Harvard College Observatory. Dr. Harlow Shapley, director of the Observatory and president of Science Service, said that dismantling and shipment of the instrument from Cambridge to China will be financed by funds contributed by Chinese residents of the Boston area.

Built originally for the Lisbon, Portugal, Observatory, the telescope was acquired by Dr. Henry Draper in 1880 for his observatory at Hastings-on-Hudson, N. Y. His widow donated the instrument to Harvard in 1886, and it has been in service there since.

First photograph of the great nebula of the constellation Orion, said by some observers to be the most beautiful object in the sky, was made with the Draper telescope. This instrument was also used by astronomers first to discover stars which have orbital motions around other stars and are called spectroscopic binaries.

Sun Yatsen University's observatory was founded in 1929, but most of its equipment was looted by the Japanese in 1938. The University is believed to be the only Chinese institution now offering courses in astronomy.

Science News Letter, August 30, 1947

CHEMISTRY

Pure Hydrogen Gas Made From Methanol and Water

► THE ABUNDANT and industrially important gas hydrogen can be cheaply made from methanol (wood alcohol) and water by a process on which patent 2,425,625 has been granted to a du Pont chemist, Dr. Alfred T. Larson of Wilmington, Del.

Methanol, which has the formula CH_3OH , can be cracked by an already known process to yield two molecules of hydrogen and one of carbon monoxide. Dr. Larson simply adds water, in the form of steam, in the presence of a catalyst. The oxygen from the water goes to convert the carbon monoxide to the dioxide, releasing one more molecule of hydrogen. The carbon dioxide is readily removed, leaving pure hydrogen to be "bottled" for use.

Science News Letter, August 30, 1947

ASTRONOMY

Stars of Autumn Now Shining

Planets are absent in evenings as September brings new season. Autumnal equinox occurs Sept. 23. Vega, in Lyra, the lyre, is brightest star.

By JAMES STOKLEY

► **ALTHOUGH** none of the naked eye planets is visible in September through the evening, the appearance of the star groups shows to one who knows the constellations that summer is nearing its end and autumn is about to start. Ever since last June the sun has been gradually creeping southwards. On Tuesday, Sept. 23, at 5:29 p.m., eastern daylight saving time, it will reach the half way mark, and stand right over the equator of the earth. This is the autumnal equinox—it marks the beginning of autumn, in the northern hemisphere, but in the lands south of the tropics, spring is now commencing.

As for the evening skies, we see on the accompanying maps their appearance at 11:00 p.m., daylight saving time of your own variety, on Sept. 1; 10:00 p.m. on the 15th and 9:00 p.m. daylight saving time, or 8:00 p.m. standard time (which will then be in effect) at the month's close. While no planets are visible at these hours, Jupiter, in the constellation of Libra, the scales, is visible low in the southwest at sunset, and disappears a couple of hours later. About three hours past midnight Mars appears, in the figure of Gemini, the twins. Still later, about two hours before sunrise, Saturn comes up, in the constellation of Leo, the lion, a little to the north of the east point of the horizon. Mercury and Venus this month are too close to the direction of the sun to be seen.

Vega Brightest Star

Turning to the stars, which are really distant suns, shining with their own light, Vega is the brightest shown. This is in the constellation of Lyra, the lyre, high in the west. Directly overhead is Cygnus, the swan, forming a huge cross, with the bright star Deneb at the top, toward the northeast. To the south of Cygnus flies another bird, Aquila, the eagle, in which Altair is the brightest star. Between Cygnus and Aquila are two interesting little constellations, now about at their best position of the year—

Delphinus, the dolphin, and Sagitta, the arrow.

Toward the east, resting on one corner, is the "Great Square," which forms part of Pegasus, the flying horse. And below are Pisces, the fishes. The northernmost star in the square is in the neighboring group of Andromeda, the chained princess. Below her in the northeast the A-shaped figure of Perseus is shown, while lower still Capella, part of Auriga, the charioteer, is just coming into view. This is a constellation which shines high in the south during the evenings of winter, so its first appearance is a herald of the colder weather which approaches.

Arcturus Leaving Us

Low in the northwest Arcturus, in Bootes, the bear driver, which was high in the evening sky of early summer, is bowing out of the picture, for soon it will be gone from the evening skies until next year. In the south another star of the first magnitude is shown, though its proximity to the horizon, and the greater absorption of its light on that account, causes its seeming diminution to the second magnitude. This is Fomalhaut, in Piscis Austrinus, the southern fish. Above it is Aquarius, the water carrier, which, like Capricornus, the seagoat, next to it, and Sagittarius, the archer, in the southwest, are constellations of the zodiac. This is the path in the heavens through which the sun,

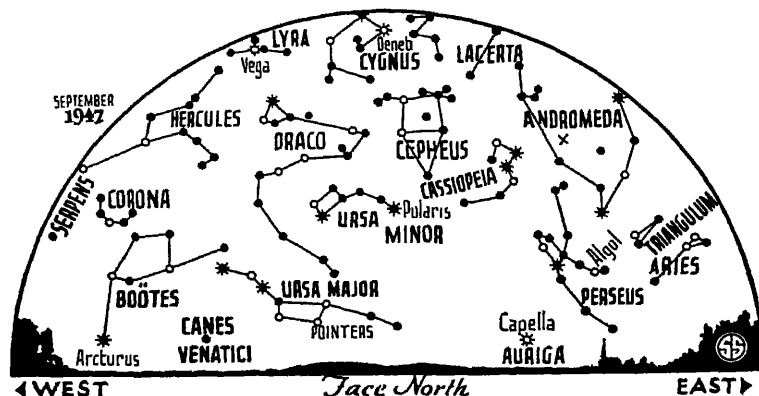
moon and planets seem to move.

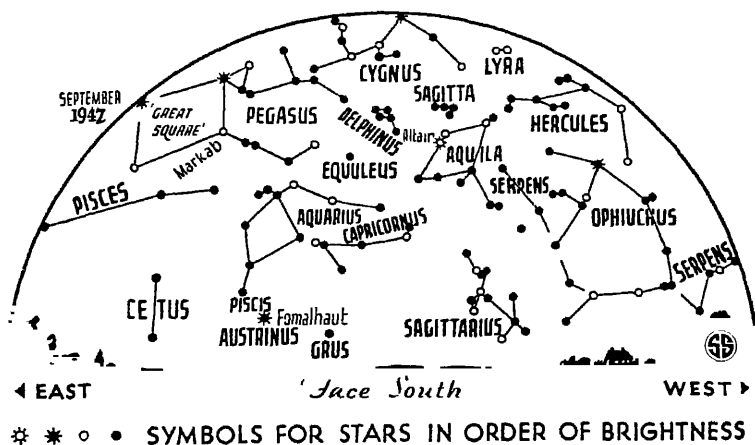
In the autumn months we have a good opportunity to see the Milky Way, for it then extends through the zenith. In competition with city lights it is hard to see, but out in the country it can be observed easily, as a luminous pathway extending from the constellation of Cassiopeia, the queen, a group in the northeast shaped like a letter W on its side. Thence we can follow it through Cygnus, and on south to Sagittarius.

Repeat Famous Discovery

With even a small telescope, or a pair of binoculars, we can make the same discovery about it that Galileo did in 1610 when he first studied the heavens with optical aid. We find that it consists of a mass of faint stars, each so distant that we cannot perceive it separately with the naked eye, but together their light combines.

It was Sir William Herschel, the 18th century English astronomer, who first offered a clear interpretation of the significance of the Milky Way in relation to the system of stars of which we are part. His studies made him realize that the reason that there are more stars in that direction is that we are there looking into a greater thickness of stars. Since the Milky Way extends completely around the sky, it means that in those directions we could travel much farther before coming to the end of the stars than if we went in other directions. In other words, our stellar system, which we call the "galaxy," has approximately the shape of a grindstone.





Our position is not at the center, which lies toward Sagittarius, but we are about 25,000 light years away from it. That is the distance that light, which travels about 11,000,000 miles a minute, would cover in a year. The brightest part of the Milky Way, therefore, is in the region of Sagittarius though because it is low in the sky this month it may not appear any brighter than the more favorably placed region above us in Cygnus.

Our galaxy is not the only system of its kind, but millions of others can be observed with telescopes outside its limits. One of these is visible to the naked eye. This is in the constellation of Andromeda, and its position is indicated on the map, by the small X under the letter R in the name of the group. This is so distant that for a long time its nature was quite a controversial matter among astronomers. Many of them thought that it and some other similar "spiral nebulae" were glowing clouds within our own system, for even the biggest telescopes failed to show any stars in their makeup. It took the 100-inch reflector at the Mt. Wilson Observatory, still the largest in the world, to break it up and reveal the separate

orbs. When the 200-inch telescope at Mt. Palomar takes the title away from the 100-inch, it will show them still better, and also will probably resolve some of the still more distant outer galaxies.

Distance of the one in Andromeda is about 800,000 light years, which means that when you observe it, the light that enters your eye has been on the way for 8,000 centuries—it began its journey before man himself had appeared on earth. Other light rays are starting from it now. What will they find when they complete their journey in this direction?

Time Table for September

Sept.	EST	
3	9:00 a. m.	Venus beyond sun
7	10:57 p. m.	Moon in last quarter
10	5:58 a. m.	Moon passes Mars
12	4:46 a. m.	Moon passes Saturn
	6:00 a. m.	Moon nearest—226,000 miles
14	2:28 p. m.	New moon
	5:33 p. m.	Moon passes Venus
15	1:31 p. m.	Moon passes Mercury
19	4:44 a. m.	Moon passes Jupiter
22	12:42 a. m.	Moon in first quarter
23	4:29 p. m.	Beginning of autumn
24	2:00 a. m.	Moon farthest—251,400 miles
30	1:41 a. m.	Full moon

Subtract one hour for CST, two hours for MST, and three for PST.

Add one hour for the corresponding Daylight Saving Time.

Science News Letter, August 30, 1947

METALLURGY

Use Cold-Drawn Steel

➤ COLD-DRAWN steels are winning such an important place in many applications that standard specifications are now to be prepared by a technical committee of the Society of Automotive Engineers.

The undertaking is viewed as a step toward wider use of these basic materials in the automotive and other

industries, with a resulting saving in time and production costs. Cold-drawn steels make better parts, it is claimed, such as bolts, studs, shafts, pinions, axle tubes, frame supports and shackle pins.

The cold-drawing of steels and other metals is not a new process, but one now more widely usable because of new technics. It consists of an operation to

reduce the cross section of a rough metal bar, and to increase its length, by drawing it through a series of conical tapering holes in die plates. Each succeeding hole is a little smaller than the preceding one.

The holes may be round, square or of other shapes. The dies may be made of a number of materials ranging from industrial diamonds, tungsten carbide and steel to chilled cast iron. Metals can be formed to much closer dimensions by cold-drawing than by other ordinary processes. The method is used to produce wire, bars for bolts and other accessories, and to form tubing.

The term cold-drawing should be distinguished from cold-rolling and cold-working. Cold-working, a process used in ancient times by shaping metals by hammers, includes the other two. Cold-rolling, which consists of passing metals between a succession of heavy rollers, is used in the production of sheets, strip steels, flat wire and other products. It is used also to produce a hard, smooth, even finish for hot-rolled metals. The formation of metal for automobile tops and fenders, by pressure in a mold, is a widely-used process of cold-working.

Science News Letter, August 30, 1947



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Do You Know?

Guests in one St. Paul hotel, at least, may sleep under electrically heated blankets if they wish.

Ethyl alcohol has been successfully made from the milk sugar in whey, a by-product of cheese manufacturing.

A big game hunter states that when you are attempting to kill a beast, you must expect that it will in turn try to kill you.

Scientists conducting research on the nuclear energy that powers atomic bombs are attending summer school at the Oak Ridge, Tenn., plant.

Muskellunge, a large American freshwater pike, often reaches five feet in length and a weight of 60 pounds, it eats other fish, young ducks, muskrats, frogs, snakes and other animals.

A South American buyer recently gave an order in the United States for a large number of flatirons to a manufacturer who puts red handles on them instead of the customary black.

Unlike poisonous snakes, Gila monsters and the beaded lizard of Mexico have their fangs in their lower jaws; these are the only two of nearly 3,000 known saurians in the world that are venomous.

In nature many non-carnivorous animals fraternize; in the old days in America, deer, elk, antelope and bison often migrated together and, in East Africa today, antelopes and zebras associate in great herds.

YOUR HAIR AND ITS CARE

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VETERINARY MEDICINE

Heavy Pheasant Losses

"Horse disease" caused many deaths among artificially reared pheasants. Vaccination has had only partial success as counter-measure.

➤ EQUINE encephalomyelitis, a serious disease of the nervous system so named because it was first observed in horses, caused disastrous losses among artificially reared pheasants in three outbreaks in New Jersey, Drs. F. R. Beaudette and J. J. Black of New Jersey Agricultural Experiment Station stated at the meeting in Cincinnati of the American Veterinary Medical Association. One of the outbreaks killed 3,757 birds out of a population of 5,094.

Vaccination has been attempted as a counter-measure, but apparently has had only partial success. Carrier of the disease has not yet been identified, but it is suspected to be something other than an insect.

Baby pigs have been dying at an alarming rate of a mysterious disease, in many parts of the Midwest. Dr. George A. Young, Jr., of Austin, Minn., offered a hypothesis that appears to convict sows as unwitting killers of their own offspring, with the milk of their first nursing as the weapon.

The course of events, as sketched by Dr. Young, includes, first, an infection of the brood-sow, then transmission

of a sensitizing substance resulting from this infection through the circulation to the unborn pigs, and finally the concentration of an antibody to this substance in the milk glands. When the sensitized baby pigs first suckle their mother and receive her colostrum or first milk they get along with it this antibody, which produces an allergy-like reaction known as anaphylactic shock. In a large proportion of cases the outcome is fatal.

Dr. M. S. Shahan of the U. S. Department of Agriculture, who is in command of the American scientific forces fighting foot-and-mouth disease in Mexico, reported to the meeting on progress in the campaign. Because the necessary measures for eradication cause serious dislocations in the lives of the people, it involves much more than a straight-out onslaught of scientists against a pest. Social, economic, legal, educational, even religious factors have to be taken into account, the speaker said. He praised the Mexicans, both officials and the people at large, for their cooperation.

Science News Letter, August 30, 1947

MEDICINE

Deaths From Clots Cut

➤ DEATHS from pulmonary embolism, or clot in the main artery from the heart to the lungs, have been cut almost in half by an operation on veins in the legs, a Massachusetts General Hospital team of physicians and surgeons reports in the *Journal of the American Medical Association* (Aug. 23).

The doctors are Jacques Carlotti, French Government research fellow in medicine, Irad B. Hardy, Jr., Robert R. Linton and Paul D. White.

The operation consists in interrupting the femoral veins in the thighs. The object is to keep the clots, which usually originate in the calves, from travelling up the leg veins to the heart and pulmonary artery where they so often become fatal.

The operation was performed in only

one patient in the period from 1936 to 1940. But it was done in 60 patients during the next five years. The mortality dropped from 50.7% in those without operation to 28.3% in those operated on.

Pulmonary embolism has generally been considered a frequent complication and cause of death after operations, broken bones and childbirth. Actually it is more frequent among medical patients, the Boston doctors found. More than half of all the patients with this condition in 10 years at the Massachusetts General Hospital were medical patients.

Most of the patients had heart disease. The great majority were over 40 years of age and men predominated.

Pain in the chest was the commonest

but not the earliest symptom. A simultaneous rise in temperature, pulse rate and breathing rate is often the first sign of the condition, sometimes occurring hours before any other change.

Doctors should constantly keep in mind the possibility of pulmonary

embolism in medical patients, especially those with heart disease, the Boston doctors warn. When discovered, it should be treated by surgical interruption of the femoral veins in both legs, to prevent recurrence of the clots which could prove fatal.

Science News Letter, August 30, 1947

AERONAUTICS

England's Jet Planes

➤ ENGLAND is stepping forward with jet propelled planes, but America is not lagging. The British have announced what is claimed to be the first jet-propelled flying boat in the world, a fighter craft, and the first all-jet civil airliner.

The fighter flying boat, with two Metro-Vick jet engines housed within the hull, has made its first flight. It is a single-seater, with one large air intake right in front. Under reasonable conditions, this provides a minimum danger of water being picked up to enter the machine.

The Tudor Eight, a civil airliner

powered with four Rolls-Royce Nene turbo-jets, is about ready for flight tests. England already has a plane, the Lancasterian, which made successful flights a year ago, but it has a combination of conventional propeller power and jet propulsion.

The earlier seven Tudor planes are all powered by propeller-driving engines of the conventional type, and vary in size from 12-passenger to 60-passenger craft. The first Tudor Four, a long-range 32-passenger plane, is now undergoing testing under tropical conditions in South America.

The United States has several all-jet and combination jet-plus-propeller planes, but they are all military craft and comparable with Britain's jet fighters. The first was the war-developed P-59 Bell Aircraft. Others include the Lockheed P-80 Shooting Star, Republic P-47 Thunderbolt, Douglas Skystreak, Ryan Fireball, and now the six-jet Martin XB-48 bomber. Also there is the Bell Aircraft XS-1, rocket powered, a special plane to beat the speed of sound.

The Martin XB-48 bomber is said to be the first six-jet airplane ever completed. It can carry a bomb load of over ten tons. Its six General Electric turbo-jet engines produce 24,000 pounds of thrust, and give the craft a speed of over 480 miles an hour.

The Ryan Fireballs are jet-plus-propeller planes. The newest Fireball, the Navy XFR-4, has a Westinghouse axial-flow engine near the rear, and a Wright Cyclone to drive the rotating propellers. The Douglas Skystreak is powered with General Electric TG-180 turbo-jet engines.

Science News Letter, August 30, 1947

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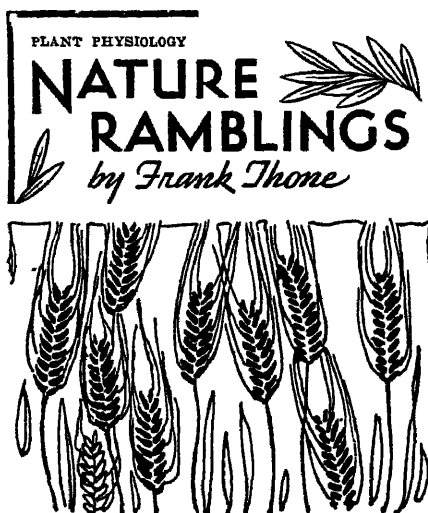
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Pinned With Magnesium

➤ A RECIPE for making life possible on an uninhabited planet might very well begin, "Use 55 parts carbon, 72 parts hydrogen, five parts oxygen, four parts nitrogen, and one part magnesium." The "parts" are atoms, and the life-enabling recipe is the formula for chlorophyll *a*, one of the two green, sunlight-capturing, food-making pigments in all green plants. Its opposite

number, chlorophyll *b*, differs by two atoms of hydrogen and one of oxygen, but winds up with the same single atom of magnesium.

Although the numbers of atoms of constituent elements in a molecule of chlorophyll is known, biochemists have not yet found out exactly how they are put together. Some tentative diagrams of its structure have been drawn up, and in practically all of them the "Mg" that symbolizes magnesium is shown at the center, as if it were the kingpin of an intricate mechanism. So it is in a sense; although we do not know what its exact function is in the activity of chlorophyll, it is certain that if that one magnesium atom were withdrawn, the remainder of the complex could no longer be called a chlorophyll molecule.

Chlorophyll, using sun-power to weld water and carbon dioxide together to form sugar, seems to act as a catalyst. That is, its own substance is neither increased nor diminished, even momentarily, by the process which it promotes, although the greater part of its bulk is made up of carbon, hydrogen and oxygen atoms—the identical elements that are bound together in the foodstuff formed by its action.

There is not even complete agreement about what that first-formed foodstuff is. It is usually said to be some form of sugar, but there are also plant physiologists who believe that starch is made first, then changed into sugar for transportation to other parts of the plant in solution. Sugars and starches are always found in such intimate association with active chlorophyll that it is extremely difficult to tell which came first.

Of this much, however, we may be certain: that without chlorophyll there would be no trees, no grainfields, no pastures, not even any mosses or green pond-scums. And every molecule of chlorophyll seems to be held together by a single pin of magnesium.

Science News Letter, August 30, 1947

needed. As a result, ordinary insulation wears away quickly and sparking often follows. These sparks, sufficient to ignite methane gas and coal dust, have caused many disastrous explosions. Leakage from high-voltage cable is exceedingly dangerous to men coming in contact with it. These trailing cables, as they are called, are used to power heavy moving machines.

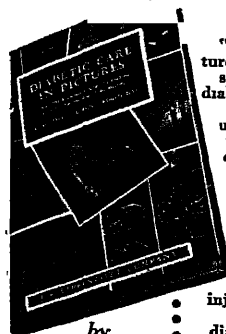
The non-sparking cable, developed by the U. S. Rubber Company, New York City, and Leonard Wilson of Kenilworth Mines, Utah, has a fine strand of wire embedded between the inner and outer layers of insulation. If the insulation becomes damaged, this wire catches incipient current leakage before an arc can occur, and carries the leakage to a sensitive circuit breaker which cuts off the power.

The safe high-voltage cable, manufactured by the General Electric Company, is already in use in the Saddle Creek phosphate mine of the American Cyanamid Company. Each conductor of the three-wire cable is covered with a metal sheath woven around the outside of the individual insulation. Each sheath is in contact with those of the other two wires, and also with ground wires set in the spaces between them. The entire cable is covered with a tough rubber-like insulation.

In the event of a break or "fault" in any part of the cable, the high-voltage current would be carried immediately by the metal sheathing or the ground wires to a panel between the cable and the main power line and there activate a device to cut off the current.

Science News Letter, August 30, 1947

to smooth the way for DIABETICS



"Diabetic Care in Pictures" was designed to smooth the way so that diabetes and its treatment might be completely understood. The result of more than 25 years of questioning in a nationally-known clinic—and the tested answer to all those questions. Simply written and lavishly illustrated by charts, photographs and drawings, it tells about the diet, measurement and injection of insulin, insulin reactions, acidosis and diabetic coma, blood and urine tests and necessary body care. The coupon below will bring a copy immediately.

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MINING

New Electric Cables Lessen Mine Hazards

➤ COAL MINE explosions will be fewer with a new non-sparking electric cable, and a new shock-proof cable will decrease danger from high-voltages in circuits leading to operating machinery.

Electric cables in mines that bring light and power from power lines to working faces usually are stretched along the floor where they are subjected to rough usage, being pulled about where

NUCLEAR PHYSICS

Betatron X-Rays Steel One Inch Thick in Second

➤ FLAWS in steel, for uses ranging from Navy guns to battleship armor, will be detected by a new 10,000,000-volt X-ray machine to be installed in the Naval Ordnance laboratory at White Oak, Md. It will take X-ray pictures of one-inch thick steel in one second.

The technical name of the machine is the betatron. It has now been completed by General Electric, Schenectady, N. Y., and is a small version of G.E.'s 100,000,000 electron-volt atom-smashing betatron. This new machine is the first of its size to be produced for industrial purposes. Its rays will penetrate a foot-thick piece of steel in minutes, as compared with hours needed previously.

Science News Letter, August 30, 1947

Books of the Week

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COLLEGE PHYSICS Mechanics, Heat and Sound—Francis Weston Sears and Mark W. Zemansky—Addison-Wesley, 383 p., illus., \$3.50. The first part of a textbook on college physics dealing with mechanics, heat and sound. It emphasizes physical principles with both background and application being given second place.

CURRENT TRENDS IN PSYCHOLOGY—Wayne Dennis, B. F. Skinner, R. R. Sears, E. L. Kelly, Carl Rogers, J. C. Flanagan, C. T. Morgan, Rensis Likert—Univ. of Pitts., 225 p., \$3.50. A collection of eight lectures under the auspices of the Dept. of Psychology of the Univ. of Pittsburgh covering experimental, child, clinical and personnel psychology, psychotherapy, human engineering, and the sample interview survey.

GENERAL COLLEGE CHEMISTRY—Leon B. Richardson and Andrew J. Scarlett—Holt, 4th ed., 704 p., illus., \$4.25. Brought up-to-date with the inclusion of the most recent information on radioactivity and atomic structure, this new edition of a standard text should fulfill its expressed purpose, that of acquainting the student with the way a scientist thinks.

LABORATORY EXERCISES IN INORGANIC CHEMISTRY—W. Norton Jones—Blakiston, 315 p., illus., paper, \$2.25. For fresh-

man college courses, this new manual supplements the text by using laboratory procedures which develop fundamental principles.

PRECIPITATION AFFECTED BY SOLAR VARIATION—C. G. Abbot—Smithsonian, Misc. Coll., Vol. 107, No. 9, Publ. 3901, 4 p., paper, 10 cents. A statistical study of precipitation in areas which had previously been investigated with respect to a regular short variation of the sun and its effect on temperature. Precipitation was also shown to follow this sun period.

THEORY OF PERTURBATIONS IN STRATIFIED CURRENTS WITH APPLICATIONS TO AIR FLOW OVER MOUNTAIN BARRIERS—Paul Queney—Univ. of Chicago, Dept. of Meteorology, Misc. Rept. No. 23, 81 p., paper, \$1.50. Develops a general theory for dealing with the subject using linear differential equations with constant coefficients, application of theory to deformation of current by a mountain range of constant cross section.

UNION LIST OF TECHNICAL PERIODICALS IN TWO HUNDRED LIBRARIES OF THE SCIENCE-TECHNOLOGY GROUP OF THE SPECIAL LIBRARIES ASSOCIATION—Elizabeth G. Bowerman, comp.—Special Libraries Assn., 3rd ed., 285 p., \$6.

Science News Letter, August 30, 1947

The fungus, known botanically as *Ramularia bellunensis*, appears to be a native of Europe. At any rate, destructive outbreaks of it on chrysanthemum plants, which are close relatives of pyrethrum, have been reported from both England and Italy in the past.

Science News Letter, August 30, 1947

GENERAL SCIENCE

This Magazine's Stories Sent to Europe by Army

► STORIES about modern science from the *Science News Letter* were picked more often by the U. S. Army for publication in Germany, Austria and Trieste than articles from any other science magazine, the Army has disclosed.

More than 2,000 pieces of contemporary American writing have been picked for publication in the U. S.-licensed press in the three European zones. Of this cross-section of American reading, 24 stories came from the *Science News Letter*. A farm publication, with 25 selections, was the only magazine chosen more frequently than *Science News Letter*.

Popular science was one of the most-chosen subjects in the writing selected, edited and shipped by the War Department's Civil Affairs Division.

Science News Letter, August 30, 1947

Airplane fare across the Atlantic is about 9.5 cents a mile.

VETERINARY MEDICINE

Sulfa Drug for Turkeys

► SODIUM SULFAMERAZINE, one of the sulfa series of germ-stopping drugs, was found an effective remedy for turkeys having the usually highly fatal fowl cholera, Dr. J. O. Alberts of the University of Illinois reported. The drug was given to 30 out of 40 tom turkeys afflicted with this malady, while ten were left untreated, as controls. The treated 30 survived, the untreated 10 all died. When new outbreaks of the disease occurred later, the sulfamerazine treatment promptly stopped losses.

Sulfathiazole, another compound in the sulfa series, was reported beneficial to chickens suffering from fowl cholera by Dr. H. M. DeVolt of the University of Maryland. One per cent of the drug mixed in with their mash at feeding time seemed to be the optimum dose; less than that proved insufficient and more was apparently unnecessary. Moreover, if as much as two per cent were given it made some of the birds sick.

Sulfathiazole was a good preventive, too, when given 48 hours before the chickens were deliberately inoculated

with the disease. It took 128 times as big a dose of germs to produce a fatal infection in chickens thus protected, as compared with unmedicated birds.

Science News Letter, August 30, 1947

PLANT PATHOLOGY

Pyrethrum, Bane to Bugs, Suffers from Fungus Pest

► PYRETHRUM, one of man's best weapons against insect pests, has itself become victim of a pest. Consequences may be serious.

As a result of the war, the cultivation of pyrethrum flowers from which the insecticide is extracted shifted from Japan to the British colony of Kenya in eastern Africa. The tall, daisy-like plants grow well on the uplands there.

Now all but one of the principal cultivation areas has been hit by a highly destructive fungus, reports R. M. Nattrass of Kenya Colony's Department of Agriculture, with headquarters at Nairobi, in a letter to *Nature* (July 26). In some fields as much as 80% of the yield was ruined.

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☼ **BOTTLE CONTAINER** for baby's bottle is a plastic cup with a conical top which has a removable projection covering the nipple itself. The container lessens danger of breaking when baby tosses the bottle to the floor, and it helps hold the temperature of the milk.

Science News Letter, August 30, 1947

☼ **VAPORIZING DEVICE**, developed by the U. S. Department of Agriculture to increase humidity in chicken houses but usable in dry-country homes, consists of an electric fan that rotates a small water wheel whose vanes dip into a pan of water. The fan's breeze adds the water vapor to the air stream.

Science News Letter, August 30, 1947

☼ **COIN COLLECTOR** from street parking meters, a home-made device built in the shops of an American city, has a coin tank, shown in the picture, made of iron sheets with welded joints. The tank is locked to the wheeled carriage, and has a flexible tube at the top



with funnel into which the coins dump from the meter.

Science News Letter, August 30, 1947

☼ **AIRCRAFT** slot antenna for radar altimeters fits into the wing or fuselage surface where it offers no drag to the air. It consists of an aluminum cavity with the exposed face of the antenna covered with a transparent plastic, and is designed to replace protruding antenna now in use.

Science News Letter, August 30, 1947

☼ **PLASTIC CEMENT**, that will hold an ordinary wire paper clip bonded to paper, is an almost universal adhesive that will bind many kinds of materials together. It is clear and colorless, dries quickly, is waterproof, and can be used to mend torn leather, cloth and board book bindings.

Science News Letter, August 30, 1947

Question Box

AERONAUTICS

Is the personal plane of 1957 likely to have a jet engine? p. 134

AGRICULTURE

What chemical rescued thousands of acres of corn in drenched fields? p. 130.

ASTRONOMY

What signs of autumn appear in the skies next month? p. 138.

What star had its secrets hidden from astronomers behind an iron curtain? p. 130.

BIOCHEMISTRY

How does histamine act to destroy disease germs? p. 131.

BIOLOGY

How many molds act as enemies of soft corn? p. 131.

CHEMISTRY

What practical use has been found for Germanium? p. 136.

ENTOMOLOGY

From what fruit has a fly poison been extracted? p. 136.

Where do mosquitoes grow in trees? p. 136.

Pictures: Cover, Zoological Society of San Diego; p. 131, NAS; p. 133, General Electric; p. 134, Glenn L. Martin.

INVENTION

How is a rocket used in life-saving? p. 131.

MEDICINE

What poison gas is used as a remedy? p. 135.

What remedy may replace silver nitrate for babies' sore eyes? p. 137.

PHYSICS

How low a temperature has been obtained with the new helium liquefier at Rutgers? p. 136.

PHYSIOLOGY

What vitamin will help you to withstand extreme cold? p. 134.

VETERINARY MEDICINE

How can germs be smuggled into man? p. 132.

What birds are dying of horse encephalomyelitis? p. 140.

What new steps are being taken toward the control of rabies? p. 138.

What new use had been found for PABA? p. 130.

Books

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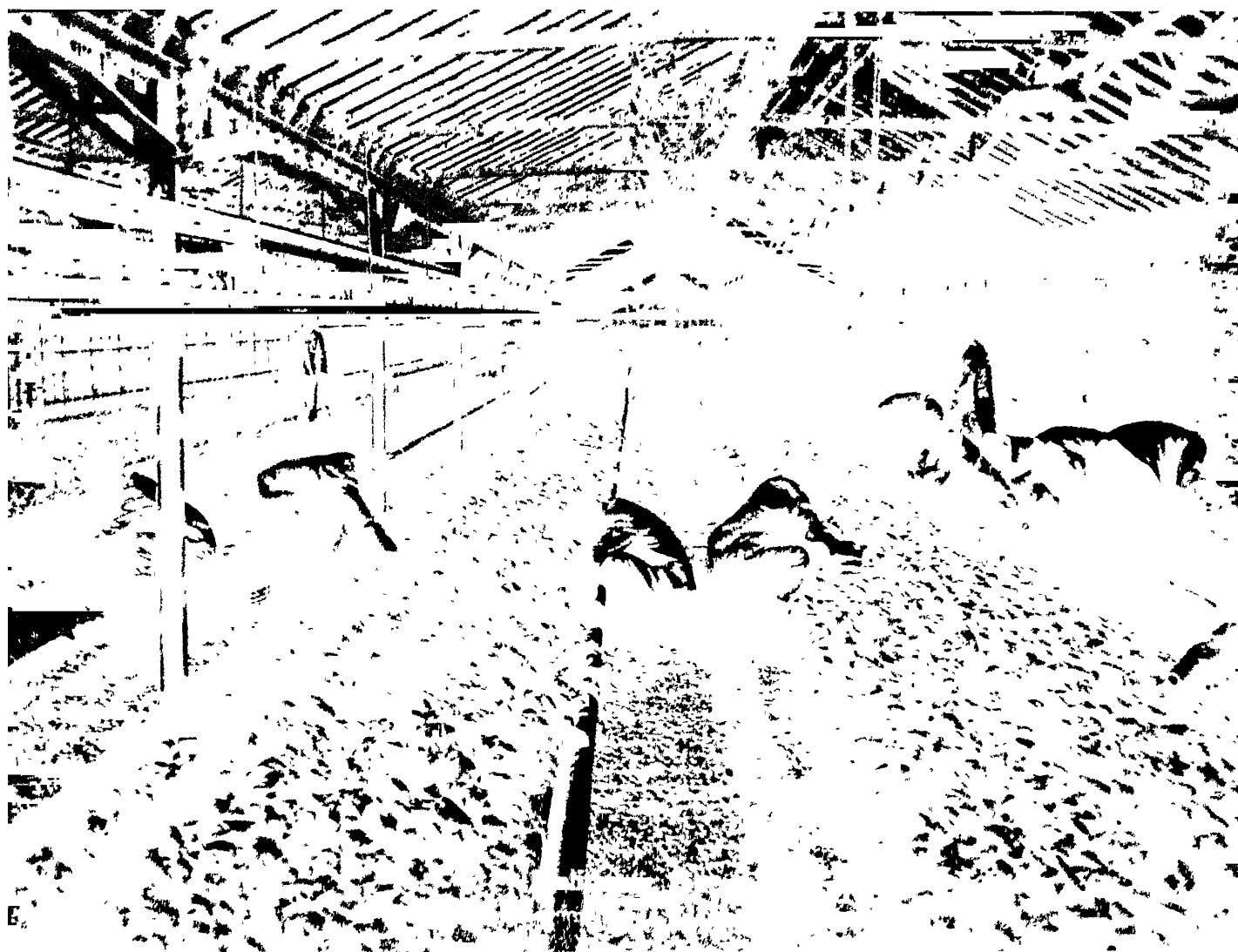
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PHYSICS

100-Mile Ascent Possible

Human passenger could ride on V-2 rocket and could describe his trip by radio. Only drawback is that he could not land alive.

➤ THE MOST exciting ride in the world, a few-minute trip to higher than 100 miles above the earth, could be made today by a human observer who could tell about it.

The ride, a trip aboard a V-2 rocket, would probably kill the rider, but not until he had been able to radio his story of most of the flight. Death would come from the impact upon return to earth. "Progress is being made" toward solving the problem of safely landing a human passenger on a high-altitude rocket, explains Dr. J. A. Van Allen, physicist at the Applied Physics Laboratory of the Johns Hopkins University, Silver Spring, Md. But, he adds, it would be "most immoral" to accept any volunteer's offer to ride a V-2 today.

Meanwhile, the scientist offers the next best thing, and a far safer one: a scientific account of the first passenger trip on a V-2 rocket shot 100 miles above the earth.

Dr. Van Allen gives his account of the imaginary ride of the future in *The Explorers Journal*, (Summer) published by The Explorers Club, New York. The flight would be made in a missile such as one of the V-2's now being fired at White Sands, N. Mex.

As the missile takes off from White Sands, powered by enough fuel to drive an automobile from New York to San Francisco and back seven times, the roar of the jet sounds "like a million blowtorches in unison" to our human passenger. As the rocket climbs, the observer inside the rocket is forced deeper down into his seat by the force of acceleration.

Half a minute after the take-off, the rocket is traveling faster than sound. Suddenly, the roar of the jet stops.

In a few seconds movement becomes difficult for the missile passenger.

"The toughest part of the ride is at hand. His head throbs, his eyes lose focus."

But 70 seconds after the take-off, our hero again rouses to full consciousness. The missile's fuel is exhausted. Silently, the first human missile rider travels high above the earth. Through powerful bi-

noculars, he can look down at Elephant Butte Reservoir, the Rio Grande River, El Paso and Albuquerque. Toward the horizon he can see the Pacific Ocean and the Gulf of California.

As he rises, he must grasp a safety handle, for he is free of the force of gravity. His binoculars float in front of his face as he releases them.

Six minutes after the take-off, the rocket is descending from more than 100

AERONAUTICS

Skystreak Sets Record

Behind the design of this turbo-jet plane lie twenty years of research. Is result of cooperation between NACA, Navy and Douglas engineers.

➤ THE NAVY Skystreak research plane, that just flew faster than any piloted plane has ever flown before, owes its superiority to cooperation in design between the National Advisory Committee for Aeronautics, Navy aviation experts and Douglas engineers. It was built by the Douglas Aircraft Company.

This plane now holds the world's speed record. It flew four times over the Army test course at Muroc Dry Lake, Calif., at an average official rate of 650.6 miles an hour, beating the record of the Army Shooting Star by 27 m.p.h.

Behind the design of the Skystreak are some 20 years of investigation of flight by the National Advisory Committee for Aeronautics made in its laboratories and various types of windtunnels. It is in these that the shape of wing, control airfoil and fuselage best suited for sonic flight has been determined.

This Douglas Skystreak, known in the Navy as the D-558, is a low-wing monoplane that does not differ much in general appearance from other fast jet-propelled planes. It is powered with a General Electric TG-180 turbo-jet engine similar to those used in other planes. Its air intake is centered in its nose. Its fuselage is bullet-shaped. Its wings and airfoil controls are especially designed on NACA standards for high

miles altitude, falling back toward the earth. The first missile rider in history pulls a lever.

"The entire compartment is explosively separated from the remainder of the missile. A small parachute flutters out, is quickly torn away with a jerk. Another and another follow. Finally, one holds.

"The main 'chute opens. The entire compartment swings gently from the shrouds. The observer sees the after-body of the missile strike the desert far below him and toss up a huge crater of sand and boulders.

"He drifts slowly downward to the surface, rolls over a few times, opens the compartment and steps out.

"This," concludes Dr. Van Allen, "is exploration of the future."

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speed. In body construction, it was built much stronger than ordinary planes so that it can better withstand the shock waves and pressure at high speeds.

The Skystreak made its first flight on May 28, 1947. Since then it has been put through a testing program at greater and greater speeds. The procedure followed was to fly the plane in each testing program first at a six-mile altitude at a designated "Mach Number." This is the ratio of its speed to that of sound at the particular altitude.

The speed of sound, which is limited by the ability of the air to adjust itself to the pressure of the sound waves passing through it, is approximately 760 miles in ordinary temperatures but only some 660 miles in the extremely low temperatures seven or eight miles up.

After the plane reached at high altitudes the designated Mach Number, it was put through maneuvers to reveal impending buffeting, or loss of control or stability. Then the plane, at lower and lower altitudes, was flown at a speed to reach the same Mach Number. This means at an increase in true speed, but with little change in aerodynamic problems. Thus, phase by phase, the plane inched toward its goal of flight in the transonic speed range.

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NUCLEAR PHYSICS

New Atomic Pile Revealed

"Fast reactor" uses man-made plutonium as energy source and sets up chain of fissions with neutrons moving thousands of miles in every second.

► THE NEW kind of atomic energy machine or "pile" announced at Los Alamos is essentially an atomic bomb that can be kept under strict control and made to release its energy slowly.

The "fast reactor," as it is known, uses the same kind of fast neutrons (moving thousands of miles per second) that set up the very speedy chain of fissions of plutonium atoms in the explosive bomb. Neutrons are fundamental particles of matter that can smack into the hearts of fissionable atoms and tear them asunder.

For the first time, too, a controlled atomic energy source uses the man-made bomb element, plutonium, instead of the uranium that occurs in nature.

While the new "fast reactor" is not in itself a practical source of power in its present form, it does explain why those who have known what has been going on were not too enthusiastic about the power production possibilities of the older type of atomic piles which use the slow neutrons.

Dr. Norris E. Bradbury, scientific director of the Los Alamos Scientific Laboratory, in announcing that the new atomic energy plant has been operating since last November, called it "another step" toward finding the best kind of atomic power plant.

The immediate use of the new atomic pile is to study under controlled conditions highly concentrated, intense and very high velocity neutrons, hitherto only obtained from the actual explosion of an atomic bomb.

The similarity of the new reactor and the actual atomic bomb is emphasized by the fact that all other reactors have their nuclear fuel mixed with some diluting substance, such as very pure graphite or heavy water, which slows down the neutrons. The new pile has no such material in it and it is also known that the bomb also has no such extraneous material in it.

Development of the fast reactor now announced presumably cost one human life, that of Dr. Louis Slotin, who was

victim of a radiation accident at Los Alamos in May, 1946. Dr. Slotin is understood to have received a fatal dose of radiation when he separated with bare hands masses of fissionable material that were beginning to shine with a blue glow, a preliminary to what probably would have been a disastrous atomic explosion. His self-sacrifice probably saved the lives of fellow scientists and the experimental set-up that has now brought forth the new atomic device.

A husband-and-wife team of physicists, Drs. David B. and Jane Hamilton Hall, is in charge of the fast reactor and its various experiments, while the engineer in charge is Robert I. Howes.

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AERONAUTICS

Radio Guide System Has Dots in "Natural" Places

► A NEW instrumental guiding system for airplanes seeking to land in thick weather, especially at night, has just been patented by two New York inventors, E. M. Deloraine and G. J. Lehmann.

Most instrument systems present their data on various dials and screens on the plane's instrument panel. But pilots have a tendency, ingrained from lifelong habit, to try to see their way through fog or rain by peering through the windshield for visible landing lights on the field.

The Deloraine-Lehmann system undertakes to work with this natural tendency instead of fighting against it, by placing a screen directly in front of the pilot's eyes, so that the bright dots representing the positions of the radio guides are in the same position as the landing-field lights.

On the same pedestal with each of the latter, they propose to place a low-power radio sender. Signals from these senders, picked up on the plane's antenna, are translated into light-dots by a scanning oscilloscope and projected onto the screen with suitably-arranged lenses and mirrors.

The view through the windshield is otherwise unobstructed, so that if the pilot can get sight of the visual landing aids he will be reassured by seeing them in exactly the same positions as the radioed light-dots on his screen.

Patent 2,426,184, issued on this system, is assigned to the Federal Telephone and Radio Corporation of New York.

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SKYSTREAK—This research plane, designed to explore speeds close to the speed of sound, has set a new record. It is made by Douglas and flown by the Navy.

PHYSIOLOGY-GENETICS

Study Atom Bomb Effects

Long-range research program on radiation results on Japanese children and their children will be undertaken by NRC and Atomic Energy Commission.

► THE EFFECTS of radiation from the atomic bomb on Japanese children and their children's children will be investigated in studies under the guidance of American experts including the genetics authority and Nobel Prize winner, Dr. H. J. Muller of the University of Indiana.

The studies will be part of a long-range research program to be undertaken jointly by the Atomic Energy Commission and the National Research Council.

The effects of atomic radiation on blood cells and on the development of various disease conditions, including the formation of peculiar scar tissue called keloids, will also be studied.

Knowledge important for protecting the health of workers in atomic energy production plants and everyone living in the atomic age may come from the studies.

Excellent health safety records have been maintained in the atomic energy industry. And there is no reliable evidence so far on which to base an opinion about the frequency of abnormalities among children born in Hiroshima and Nagasaki since the atomic attacks. But with radioactive substances playing an increasingly important role in everyday life in the United States and perhaps elsewhere, medical authorities believe it important to gain all possible information on the subject.

The long-range research program is a result of a directive issued by President Truman. It will be financed by the Atomic Energy Commission and the scientific program will be directed by the National Research Council's committee on atomic casualties. As far as practicable, Japanese scientists will take part in the studies under arrangements to be made with Gen. MacArthur's staff.

Dr. Thomas M. Rivers of the Rockefeller Institute is chairman of the committee on atomic casualties. Other members are: Dr. George W. Beadle, California Institute of Technology; Dr. Detlev W. Bronk, National Research Council; Dr. Austin M. Brues, Argonne National Laboratory; Dr. George M. Lyon, chief of the Radioisotope Research

Section, Veterans Administration, Washington, D. C.; Dr. Shields Warren, Harvard Medical School; Dr. Stafford L. Warren, University of California, Dr. George H. Whipple, University of Rochester; Dr. Raymond E. Zirkle, University of Chicago.

The studies in heredity and genetics will be under the guidance of Dr. Muller and Drs. C. H. Danforth, Stanford University; D. R. Charles, University of Rochester; L. H. Snyder, Ohio State University, and James V. Neel, University of Michigan, who will be in charge of the field studies in Japan.

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NUTRITION

Britain Could Raise Own Food, But Shouldn't

► BRITAIN could raise all her own food on the land of her own home islands, declared H. D. Walston, farm leader in eastern England, speaking before the meeting of the British Association for the Advancement of Science in Dundee, Scotland. But, he added, Britain should not attempt any such program, because it would necessitate permanent radical changes in the kingdom's living standards.

One reason why more acres are not being farmed in Britain, and why those now under cultivation are not pushed to higher yields, the speaker said, is lack of incentive. While farm rents have remained stable for some 50 years, farm wages have been increased sixfold since 1910. Consequently the urge has been to increase the yield per man rather than the yield per acre.

Mr. Walston expressed himself as opposed to the idea of complete national self-sufficiency in food production:

"We could grow any crop we wished here if we went to sufficient trouble, but the less suitable the natural environment the more trouble we have to take. This results in less efficiency because of the greater effort needed to overcome nature. We should work with nature rather than against it, encouraging natural crops such as vegetables and fruit,

grain, particularly in the Eastern Counties, and above all grass, and with it livestock. Grass should be the main crop of British agriculture, other crops being supplementary. . . .

"Only two types of people live entirely on home-produced food—the subsistence farmer who has no money to buy food elsewhere; and the rich industrialist whose dividends pay for the loss on his farm. We no longer have the dividends and it would be a curious ambition to want to revert to subsistence farming if we don't have to."

Self-sufficiency, the speaker concluded, does not mean the ability to produce a complete range of products, but the ability to produce sufficient wealth to permit trading with other countries.

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SCIENCE NEWS LETTER

Vol. 52 SEPTEMBER 6, 1947 No. 10

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 893 7th Ave., N.Y.C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439

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PUBLIC HEALTH

DDT Tested Against Polio

Outbreak in Wilmington, Delaware, causes that city to attempt to kill off all flies, suspected of spreading infantile paralysis. Sprayed from planes and on ground.

► INFANTILE paralysis gives signs of levelling off throughout the nation. At the same time a sharp outbreak in Wilmington, Del., has turned that city into a proving ground for trial of DDT as an anti-polio weapon.

A total of 529 cases for the nation were reported from state health officers to the U. S. Public Health Service for the week ending Aug. 23, latest on which official figures are available. This is an increase over the 411 reported the previous week. But it is only a 28% increase, whereas there was a 47% increase during the preceding week (Aug. 16). The drop in percentage increase is what suggests that the polio season may be drawing to an end.

Delaware is having the largest amount of infantile paralysis for the size of its population, that is, the highest incidence rates, of any state. Latest figures for the state, obtained by special request of the U. S. Public Health Service to the state health officer, show that the state has had 78 cases from the first of the year through Aug. 25. Of these, 19 occurred on Aug. 22, 23, 24 and 25. Of the total since the first of the year, Wilmington has had the majority (57).

Wilmington has already had one spraying with DDT and will have another within a few days. The spraying, done from airplane and also by crews operating sprayers on the ground, is under the direction of Drs. Vernon B. Link and Griffith E. Quimby of the U. S. Public Health Service's Communicable Disease Center with headquarters in Atlanta, Ga.

Object of the spraying is to kill flies which are suspected of spreading infantile paralysis. Whether flies actually do spread the polio virus and whether, if so, they are the only means by which it spreads are two questions that have not yet been definitely answered.

If infantile paralysis cases drop off suddenly in Wilmington about two weeks from now, health authorities will feel that the case against flies is much stronger. They will not be convinced that flies spread the disease until they have had experience in eight or 10 out-

breaks in which cases drop sharply after flies have been routed.

Attempts to get evidence for or against flies as polio spreaders have been made with DDT before. One widely publicized was that in Rockford, Ill., in 1945. The fly population was reduced, but results on infantile paralysis were not conclusive. The reason was that the spraying was not done until the peak of the outbreak had been reached, so it was impossible to tell whether the drop in cases was due to the drop in flies or would have come anyway.

In Wilmington, the spraying has been started much earlier in the outbreak, so health authorities are hopeful that they will get more definite results. A drop in cases in less than two weeks would not be expected, because some will already have been infected before the spraying started. Ordinarily an outbreak would be expected to run for two months, so a drop in cases before then, especially a sharp drop, is the thing to watch for.

Elsewhere throughout the nation, no state reported more than 54 cases for the

week ending Aug. 23 and five states reported no cases. The 10 states with largest numbers of cases were: New York, 54; Illinois, 53; Ohio, 50; Delaware, 29; Massachusetts, 27; Michigan, 25; California, 22; Wisconsin, 21; Pennsylvania, 21, and Minnesota, 20.

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PHYSICS

Training Young Scientists Important Atomic Problem

► THE TRAINING of young scientists to carry on future atomic research may be more important to national security than any other thing being done now, David Lilienthal, chairman of the Atomic Energy Commission, said after the full commission had spent three days reviewing research progress at the University of California's famous radiation laboratory.

Development of junior scientists within the next five to ten years to carry on the work of the great scientists now probing the atom is of utmost importance, Chairman Lilienthal and Commissioner Sumner Pike stressed. Training of young scientists is to be encouraged by the commission within the framework of the policies of the individual universities.

New discoveries in basic atomic energy facts should be expected in the future as the result of the research now in progress, Chairman Lilienthal declared.

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STEEL AND BREAD—Machinery bakes bread, handling the process from the time the grain reaches the mill. This rounder takes accurately divided pieces of dough and turns out round, flour-sprinkled balls which rise on trip to the moulder which kneads and shapes the dough.

PHOTOGRAPHY

Electric Camera Shutter

New device operating with Kerr cell takes pictures in four hundred-millionths of a second. Has no moving parts.

► A CAMERA with an effective exposure time of four hundred-millionths of a second (0.000,000,04 seconds) was described to the American Institute of Electrical Engineers by A. M. Zarem, F. R. Marshall and F. L. Poole of the U. S. Naval Ordnance Test Stations at Pasadena, Calif. It was used in photographic studies of electrical discharges.

The novelty of the device is an "all-electrical" shutter, the heart of which is a Kerr cell, named after Dr. J. Kerr of Scotland who discovered its principle in 1875. The Kerr cell shutter has no moving parts. Cameras using this shutter are expected to have many applications for ultra high speed photographic work.

The novelty of the cell consists in the fact that the polarized light used can not pass through it except when the cell is supplied with an electric field. The speed of operating, therefore, depends upon the rapidity with which a required voltage

can be applied to the cell electrodes.

The ordinary Kerr cell is composed of two flat plates, or electrodes, immersed in a fluid which becomes what scientists call "birefringent" upon the application of an electric field. This means that it is doubly refractive. Many fluids might be used, these scientists found that nitrobenzene seems to have the highest Kerr constant.

When this cell is placed between polarizers crossed for minimum transmission of light, the arrangement becomes an optical shutter. A polarizer is a material which transmits only those light waves that vibrate in one plane. The waves of ordinary light vibrate up and down, and from side to side. In this so-called Kerr optical shutter, a voltage applied to the electrodes has the effect of altering the state of polarization of light, and permits transmission through the second polarizer.

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PHOTOGRAPHY

Three-Dimension Pictures

Life-like pictures that require no colored glasses or other gadgets for viewing are taken with wide-angle lens on film with tiny ridges.

► LIFE-LIKE pictures which will let you actually peek around corners, the way you see objects in real life, will soon be shown to the public.

Three-dimensional pictures will probably make their debut at the Naval Photographic Center, Anacostia, D. C. The photographic system, called "Trivision," will be shown by its inventor, Douglas F. Winnek of Mount Vernon, N. Y., under the auspices of the Navy. Inventor Winnek is now putting the finishing touches on his equipment at the Navy's Aeronautical Photographic Experiment Laboratory at the Philadelphia Navy Yard.

No special seeing devices or other gadgets are used to get depth in trivision pictures. Tiny, almost invisible ridges on the film are the heart of trivision's

three-dimensional pictures.

Here are some of the developments predicted for the new stereoscopic photography:

Snapshots in which you can look slightly around the object in the picture

Three-dimensional X-rays which may help tell surgeons just how deep to cut.

Paper-print trivision for magazine covers and advertisements.

Display advertising in subways and windows with the "deep" trivision view.

Printing-press reproduction for depth in news shots.

More accurate depth in aerial photographs.

Educational and training pictures with greater perspective. This is one of the Navy's interests in trivision.

Further in the future, but entirely

possible some day, are life-like, three-dimensional motion pictures using trivision.

When trivision becomes available generally, your best three-dimensional pictures will be taken with a wide-lens camera. The lens used in the Navy's trivision camera is 10 inches in diameter.

In the new system, ridges, or lenticulations, on a transparent picture surface are applied to the film. These ridges serve as thousands of tiny lenses taking many pictures when the film is exposed in the camera. The picture is a composite of many pictures. The large lens of the camera, wider than the separation between an observer's eyes, gives several binocular views.

Navy trivision equipment developed by Mr. Winnek includes a press for putting the ridges on film surfaces, a single-lens camera and an enlarger printer for performing a peculiar and critical movement of the film during enlargement or reduction of a picture.

The story of trivision and its inventor has some of the elements of both the life of Edison and the famous Horatio Alger tales. Mr. Winnek, now only 40 years old, first became interested in three-dimensional pictures as a movie usher in his boyhood, and later doing publicity for motion pictures. At one time, Radio-Keith-Orpheum backed his attempt to produce depth in pictures, but the depth turned out to be fuzziness from vibrations.

A dozen years ago, Mr. Winnek made the discoveries that led to trivision. By 1940, he was able to demonstrate his system to the Temporary National Economic Committee in Washington. At that time, he showed his work to Science Service. Through this institution, the Research Corporation in New York was interested in trivision and supported his work for several years.

The U. S. Naval Photographic Service became interested in the possible military applications of the system, and the inventor has worked with the Navy for the past two years, perfecting his method of producing more life-like pictures.

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In about one-fifth of the land of the world there is a permanently frozen stratum either on, or at variable depths below, the surface.

Automobile tires when under-inflated give more traction but wear out faster; the increased traction is due to the wider surface in contact with the road.

METALLURGY

New Alloys Stand Heat

Ceramics also among materials developed for use at tremendous temperatures in gas turbine engines and superchargers. Stand up to 1,500 degrees Fahrenheit.

➤ GAS turbine engines, the coming power plants in many applications ranging from airplanes to trucks and buses, are possible because scientists succeeded in developing metal alloys capable of withstanding very high temperatures over long periods, the American Society of Mechanical Engineers was told by Dr. Clyde E. Williams, director of Battelle Memorial Institute, Columbus, Ohio.

A group of new super metals and ceramics soon will be available for man's new high-powered machines, the turbo-jet, rocket and atomic energy power plants, he said. They will withstand higher temperatures and pressures than materials now available, and so will offer potentialities for power generation that are "simply staggering."

Materials developed during the past decade withstand high stresses and temperatures up to 1,500 degrees Fahrenheit, Dr. Williams said. These made the present gas turbines possible, and also the superchargers which furnish air to the engines of high altitude bombers and fighters, and to the gas turbines in jet planes. Engineers are now asking for material that will withstand 1,600-degree heat.

For the supercharger, disk materials must withstand a temperature of 1,100 degrees Fahrenheit under high stress. For this purpose, chromium-nickel-cobalt-iron alloy, strengthened with such other elements as molybdenum, tungsten, columbium or titanium, is used. The gas turbine blades used in superchargers and jet engines are subjected to temperatures of 1,500 to 1,600 degrees, and the metal sometimes reaches a temperature of 1,500 degrees Fahrenheit.

To secure stability, still more highly alloyed materials must be used and some are practically free of iron. The strongest materials suitable for precision casting are the cobalt-base alloys containing 40% to 70% cobalt and such other additions as chromium and molybdenum, or chromium, nickel, molybdenum, tungsten and columbium.

Another series of alloys, based on chromium, with upwards of 50% of this

metal, is showing great promise. An example is one that contains 60% chromium, 15% to 25% molybdenum, balance iron. This alloy must be melted and cast in a vacuum. In preliminary tests it shows up better than the cobalt-base alloys.

The high-temperature super metals developed for the gas turbines, and improvements on these yet to come, will be useful, but to meet the highest temperatures these will not suffice and ceramics materials will be called for, Dr. Williams stated. These ceramic materials, made up from the most highly refractory substances such as oxides of beryllium, aluminum, magnesium, zirconium, and so on, are the only known materials that will not melt or burn up at the high temperatures that may be required. They may be used as coatings for metals, as structural combinations with metals, or as individual parts.

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BIOLOGY

New Antibiotic from Soil Discovered in England

➤ WHOOPING cough, typhoid fever and other diseases untouched by penicillin may yield to a new disease remedy from germs, called aerosporin.

This new potential remedy comes from a bacterium found in the soil in Surrey and Yorkshire and also in the tap water in an American city, Chicago.

Discovery of aerosporin is reported by Drs. G. C. Ainsworth, Annie M. Brown and G. Brownlee of the Wellcome Physiological Research Laboratories, Beckenham, Kent. (*Nature*, Aug. 23)

Aerosporin is extracted from the broth in which the bacterium grows by methods like those used for extracting streptomycin. Streptomycin also comes from an organism found in the soil, but its parent organism is more like a mold than a bacterium. And streptomycin has also been reported active against the germs of whooping cough and typhoid fever.

Aerosporin not only checks the germs but actually kills them, Dr. Ainsworth and associates report. Another advantage

is that apparently disease germs will not grow resistant to it as they do to sulfa drugs, penicillin and streptomycin. At least, the Wellcome scientists were unable to make germs acquire resistance in test-tube experiments.

The new chemical is readily produced, relatively stable and weight for weight is as powerful against one class of disease germs as penicillin is against another.

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Home-rendered lard is in less danger of getting rancid with age if a pound or so of vegetable shortening is added to 25 pounds of the lard when it is made.

INVENTION

Chinese Typewriter Shown By Author-Inventor

➤ THE MINGKWAI typewriter, which types 90,000 Chinese characters and also can type in Japanese, Russian or English, has been demonstrated by its inventor, Lin Yutang, the Chinese author of best-selling American books.

The unique machine, about the size of a standard American model typewriter, requires only three keys to be pressed for each word. A top and bottom key bring into position a choice of eight words of the same category. The operator then picks the one word of the eight which he wants by pressing a third key.

Claimed to be adaptable to teletype or typesetting machines, the invention may be extremely important to communication in China. The Mingkwai typewriter now does a day's work by a Chinese copyist in one hour.

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TYPES CHINESE—This typewriter looks conventional enough, but it is estimated by its inventor, the author Lin Yutang, to be capable of advancing the progress of China by a decade. It can print 90,000 Chinese characters by pressing three keys for each word.

PHYSICS

New Term Proposed for Study of Atomic Nucleus

➤ SCIENTISTS have discovered so many new facts about the heart of the atom, the nucleus, that a new scientific term is needed, an atomic scientist suggested.

The new word for your atomic vocabulary is "nuclide." Truman P. Kohman of the Institute for Nuclear Studies of the University of Chicago proposes the new term (*American Journal of Physics*, July-August).

Nuclide, he explains, comes from the word nucleus and a Greek word meaning species, sort or kind. Hence, nuclide means a species of nucleus.

One of several members of the proposed nuclide family would be the famous isotopes. But radioelement or radioisotope should now be called radionuclides in most cases, declares the physicist.

A nuclide is defined as a species of atom characterized by the construction of its nucleus, particularly the number of positive electrical units and neutral particles in the nucleus of the atom.

Isotopes, under the new scheme, are nuclides with the same number of positive charges in the nucleus. Thus, they belong to the same element, though they have different atomic weights.

Other atomic nuclides are the isotone, isobar, isodiaphere and isomer. These are all chemical terms classifying atoms by the number of positive electrical units and neutral particles in the nucleus.

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VETERINARY MEDICINE

American Dogs Endangered By Yellow Jaundice Spread

➤ DOGS in this country are in serious danger from a highly infectious, often fatal form of yellow jaundice, that has been spreading rapidly during the past ten years, Col. Raymond Randall of Washington, D. C., warned the meeting of the American Veterinary Medical Association. The disease is marked by yellowish skin discoloration, high temperature, depression, loss of appetite, bleeding gums and intestinal trouble.

The cause is a corkscrew-shaped bacterium of the genus *Leptospira*. Strains of the same germ are known to cause jaundice-like diseases in other animals, including rats, mice and man. Some dogs are not made very sick by the disease, but serve as carriers to healthy

animals, which sometimes die of it.

When the disease has been definitely diagnosed with the aid of laboratory tests, it should be combated with serum and penicillin, Col. Randall recommended.

Cases of disputed paternity among animals can be decided in much the same way as among human beings, by blood-group tests, Dr. L. C. Ferguson of Ohio State University told the meeting. Blood-grouping may eventually be of practical use in breeding programs, he predicted.

Deer and elk were indicted as immune or resistant carriers of the dreaded liver-fluke disease of cattle and sheep by a committee of the Association under the chairmanship of Dr. W. E. Swales. Stockmen whose range is also used by deer or elk were warned to maintain special vigilance against this disease.

Two medals were awarded to members of the Association. The Twelfth International Veterinary Congress Prize, highest award in veterinary medicine, was presented to Dr. William J. Butler of Helena, Mont., and the Borden award and medal to Dr. Jacob Traum of the University of California.

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PHYSIOLOGY

Skin Eruptions Related To Starch Digestion

➤ A BAD complexion may be due to sluggish starch digestion, it appears from studies reported by Drs. Charles W. Bauer and William Francis Martin of Massachusetts College of Pharmacy to the American Pharmaceutical Association in Milwaukee, Wis.

Their studies were made with a chemical in saliva which digests starch, converting it into sugar. The activity of this chemical, which they term salivary amylase, is not the same in all persons. The variation may be considerable.

This chemical from the saliva of 150 persons without skin eruptions took from one to six minutes to digest starch. But that from 79 persons who had skin eruptions varied from one minute to over one hour in digestion time.

More than half, 45, of these persons with skin eruptions had a digestion time of over six minutes.

"It seems possible," the scientists concluded, "that people with skin eruptions may have sluggish salivary amylase."

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IN SCIENCE

VETERINARY MEDICINE

New Anesthetic Is Safe For Horses and Cattle

➤ A MIXTURE of old-fashioned knock-out drops (chloral hydrate), Epsom salt and pentobarbital sodium has had good results as a total anesthetic for horses, bulls and other large animals that need surgical attention but might suddenly send the veterinary himself to the hospital in the midst of the operation. Dr. E. W. Millenbruck of Carthage, Mo., described this new aid to the veterinary surgeon, which he developed jointly with Dr. M. H. Wallinga of Cedar Rapids, Iowa.

The mixture is safe and non-poisonous, said Dr. Millenbruck. It produces a short but complete period of anesthesia, enabling the surgeon to work undisturbed. The animals recover from its effect quickly and without the floundering that might cause them further injury. He stated that he has used it in animal surgery that without it would have been difficult for him and painful to the animals.

Science News Letter, September 6, 1947

NUTRITION

Almond Hulls Indicated As New Syrup Source

➤ SYRUP from almond hulls is a new suggestion for eliminating some of the waste of the world's food products.

Dr. William V. Cruess, food technologist in the University of California College of Agriculture, has determined in new experiments that 100 gallons of good quality table syrup can be made from a ton of dried almond hulls. The hulls have a 25% sugar content.

He estimates that the syrup would cost about twice as much as other syrups, but adds there would probably be a market for it at the present time. Beet-sugar factories might in off-seasons convert the hulls into syrup. Almonds shelled in 1946 left 35,000 tons of shells to be disposed of.

Dr. Cruess and two students, John Kilbuck and Ernest Hahl, have found that almond hulls can also be converted into crude molasses for livestock and used as a source of tannin extract for tanning leather.

Science News Letter, September 6, 1947

E FIELDS

SOCIOLOGY

Rich Children Found Taller and Heavier

➤ **RICH CHILDREN** of Ottawa, Canada, average an inch taller and three pounds heavier than poor children of the same age.

This difference in development of children of upper and lower economic classes is revealed in a study of more than 5,000 school children made by Dr. J. W. Hopkins, biometrician of the National Research Laboratories in Ottawa and reported to the American journal, *Human Biology*.

The children in the good residential districts were predominantly from families of business, professional and administrative men. The poorer districts included children of artisans, trades-people and government employees of the clerical grade. Both groups were of British ancestry, mostly English and Scotch.

Both rich and poor are larger than similar groups measured 10 years ago. The fact that rich children are larger than poor children confirms the theory that the increase in stature may be due to improved nutrition and environment.

Science News Letter, September 6, 1947

CONSERVATION

Conservation of Coal Urged in England

➤ **FORESEEING** a possible long-continued shortage of coal in the United Kingdom, scientists at the meeting of the British Association for the Advancement of Science urged conservation through the use of improved combustion methods.

"About one-quarter of the total yearly output of coal is today consumed in old-fashioned and inefficient open grates," Prof. D. M. Newitt of the Imperial College of Science and Technology, London, told the group. "From every point of view, this practice is undesirable, and more refined and efficient methods based upon electricity and gas should be substituted."

In order to make the most efficient use of coal, a knowledge of the different types of coal is essential, A. C. Monkhouse, deputy director of the British Fuel

Research Station, Greenwich, told the meeting. Nine coal survey laboratories have been set up in the principal coal fields and the properties of the coals have been determined, he said. The influence of the type of coal and system of combustion on deposits within factory furnaces, methods of smoke prevention, and heat emission from domestic appliances are being studied.

"The domestic fire belongs to an age of abundant coal, cheap labor and carelessness about social amenities," Prof. J. D. Bernal of Birkbeck College, London, declared. "Its efficiency as a generator of heat ranges from five to fifteen per cent, and of the heat which enters the house, most is lost through poor insulation and excessive ventilation. As a result the bulk of the British people keep much less warm and use more of their needed coal than do our cousins in America in far more severe winter climate."

Large economies, he said, can only take place by modifying existing equipment, and research is badly needed into methods of increasing the efficiency of ordinary domestic fires and into providing cheap means of increasing the insulation of houses.

Science News Letter, September 6, 1947

VETERINARY MEDICINE

Dogs May Get Epilepsy, Other Nervous Diseases

➤ **DOGS** may develop epilepsy, Dr. C. F. Schlotthauer of Mayo Foundation, Rochester, Minn., told members of the American Veterinary Medical Association at their meeting in Cincinnati.

The epilepsy is the kind, which humans also have, which arises without any known cause and is termed idiopathic.

Fits, convulsions and paralysis are the most frequent nervous symptoms seen in dogs, Dr. Schlotthauer stated. They are not specific for any one disease, however, but only indicate where the trouble originates, not its cause.

Viruses probably account for most of the ailments that can be attributed to injury or damage of the brain and spinal cord. Disturbances of blood circulation and tumors, which are common causes of damage in the brain and spinal cord of man, are less frequent in dogs.

Sometimes poisonous substances in the diet or diets lacking in essential vitamins or amino acids may give rise to nervous disorders in dogs.

Science News Letter, September 6, 1947

MENTAL HEALTH

Three-Way Mental Health Program Starts Underway

➤ **THREE-WAY** national attack on mental health problems is underway with funds appropriated by Congress.

The program calls for increased research, more training of personnel and support and stimulation of state mental health programs.

A total of \$3,000,000 of the \$7,500,000 appropriated by Congress is slated for grants-in-aid to states for local mental health work. Aim of the project, U. S. Public Health Service officials said, is to establish one out-patient mental health clinic for each 100,000 of the population, plus traveling units for sparsely settled areas.

State grants will be made on the basis of programs and budgets now being received by the Public Health Service, but the mental health clinics will be delayed by the lack of trained personnel.

Part of this problem is being tackled by more than \$1,000,000 in grants to institutions. Funds for developing and improving facilities for training urgently-needed mental health personnel have been granted to 17 institutions in the field of psychiatry, 16 in clinical psychology and nine each in psychiatric social work and psychiatric nursing. Financial aid to 209 graduate students in the four fields is also being provided.

Mental health research will be aided by grants of approximately \$400,000 in the fiscal year 1948, the Public Health Service reported. Twenty-five research projects and research fellowships are included in the program for studying mental health problems.

A National Institute of Mental Health may be established near the capital.

Science News Letter, September 6, 1947

ASTRONOMY

Dr. Henry Norris Russell Appointed to Harvard

➤ **DOCTOR** Henry Norris Russell, who served as director of the Princeton University Observatory for 35 years before his retirement on July 1, has been appointed a research associate at the Harvard College Observatory.

Dr. Russell for many years has been a member of the Harvard Overseers Committee to visit the Harvard Observatory and department of astronomy.

Science News Letter, September 6, 1947

HORTICULTURE

Hydroponic Harvest Reaped

Fresh vegetables by the ton are being grown without soil so that soldiers away from home can have tasty rations necessary for health and morale.

By DR. FRANK THONE

See Front Cover

➤ **RIPE RED**, juicy tomatoes—a thousand tons of them—have been grown by soilless gardening methods in Japan this season so that our occupation troops might have something fresh that “tastes like home.” With them have been produced lettuce, cucumbers, green peppers, onions and radishes enough to run the season’s total up to about 3,180,000 pounds—really quite a sizable salad bowl.

Elsewhere in our new far-flung outposts there are smaller hydroponic installations raising greenstuffs to maintain the health and morale of our men. There is one such garden at Atkinson Field in British Guiana, one on Iwo Jima, one at Nanking, China. The Atkinson Field unit supplies fresh salad vegetables, via air transport, to two or three other airfields.

Anyone who has ever seen an Army chow-line when the first green vegetable salad was served in one of these far-off places, knows how mythical is the American male’s supposed indifference to salads. True, he may not care much for hand-carved confections with whipped cream on top of the mayonnaise and a split cherry on top of that. Such salads, that look more like millinery than food, are “female stuff”—no, thank you! But plenty of crisp leaf lettuce and sliced tomatoes, with enough green-pepper rings and chopped green onions to give it pep, and just salt and pepper, vinegar and oil for dressing—Quit pushin’, Joe, there’s enough for everybody!

6,000,000 Tomatoes

Really, there is: allowing three good-sized tomatoes to the pound, the 2,000,000 pounds of them raised on the two hydroponic farms in Japan this year figure out as 6,000,000 tomatoes. Those were divided among a force of about 100,000, which averages out as 60 tomatoes per man. Not all you might eat at home, but still enough to get along on.

This ambitious venture into soilless gardening got its start during the war, when it became necessary to maintain good-sized garrisons in places too far for successful refrigerator-ship carriage of greenstuffs and too desert to grow gardens in the soil. In Japan and China they are set up for a different reason. They have soil in those countries, and rain enough; but their traditional methods of fertilization are such as to make eating unboiled vegetables a practically certain invitation to the germs of dysentery and typhoid fever.

Two Principal Types

There are two principal types of hydroponics or soilless gardening: the liquid-culture system, invented in California by Dr. W. F. Gericke; and the gravel-culture system, originated at Purdue University by Dr. R. B. Withrow. Both are based on the idea of supplying the necessary fertilizer salts to plant roots in water solution only, without relying on any soil. They are simply ap-

plications on a large scale, for actual food production, of laboratory experiments which many generations of plant physiologists have carried on with glass jars and earthenware pots.

In the Withrow system of gravel culture, which the Army chose for its use, long, shallow concrete troughs three feet wide and about a city block long are laid out on a gentle slope. Each trough is divided into three or four sections, like steps with very wide tread and very shallow risers, to facilitate the flow of the liquid carrying the fertilizer salts from top to bottom. These beds are laid out side by side, usually in sets of ten, with walkways between them for the use of the workers who plant and cultivate the vegetables. The troughs are filled with washed river gravel.

Most of the vegetables are started in seeding nurseries and set out at proper intervals in the gravel. At intervals—48 hours as a rule—the fertilizer solution is pumped into the beds until they are level full. Then they are allowed to drain into a sump at the lower end, where the losses in water and mineral salts are made good before the next irrigation period. The culture solution held in the chinks between the pebbles



HYDROPONIC PRODUCE—Japanese workers sort and pack the lettuce leaves they have carefully picked, one by one, and put them into crates for shipment to garrisons of the U. S. Army’s occupation force.



FLOWERS WITHOUT SOIL—In the United States hydroponic methods are usually employed only in greenhouses, for such costly crops as cut flowers.

provides the plants with food materials.

General direction of the hydroponics program has from the beginning been in the hands of an Air Quartermaster officer, Lt. Col. E. W. Elliott. Pioneer establishment was set up in 1945 on Ascension island, almost on the equator, midway between South America and Africa. This island was then a highly important stopping-place for planes on the way to fighting in North Africa and Asia, and a fluctuating population of about 2,000 had to be taken care of. Since Ascension is a truly desert island, every pint of water used there had to be distilled out of the sea, with oil fuel under the boilers. This establishment has since been abandoned but lessons learned there, from both successes and mistakes, have been invaluable elsewhere.

Biggest in Japan

Biggest of soilless set-ups now producing are the hydroponic farms in Japan proper, where Col. Elliott is directly in charge. He has several eminent Japanese plant scientists among his assistants. All the routine work is done by Japanese crews, though all the produce goes to the messes of the American forces. (See *SNL*, Aug. 23).

A total of 80 acres of working soil-less gardening surface is divided into two sections. At the village of Otsu near Kyoto there are 25 acres, and at Chofu near Tokyo are 55 acres. Five

acres of the latter installation are under glass—claimed to be the largest single greenhouse in the world.

This hydroponic farm has attracted a great deal of attention in Japan. The Japanese scientists are willing to devote intensive attention to it, and graduate students in Japanese universities are glad to work there at gardeners' low wages, because they want to learn the know-how. Stripped down to less than its pre-war size, the Japanese empire is going to be hard put for food, and no possible way of adding to production is being overlooked. With Gen. MacArthur's permission, the installation has been visited by members of the Emperor's immediate family. Less formally, Mrs. MacArthur last spring helped to harvest the first radishes.

Set Closer Together

Vegetables grown by hydroponic method of necessity are set closer together than is normally the case in conventional soil gardens. Cucumbers are trained up trellises, as they are in greenhouses; tomatoes are similarly supported. Most successful of tomatoes thus far tried are one or two varieties bred specially for cultivation in the tropics. Icicle radishes, an old favorite long white variety that can stand a good deal of warm weather without going to seed, have been the best bet so far as this tangy tidbit is concerned.

With lettuce, the hydroponic gardeners played in made-to-order luck. Most kinds of lettuce "bolt," that is, send up a tall stalk and go to seed, as soon as the weather begins to warm up in early summer. To overcome this handicap, plant breeders of the U. S. Department of Agriculture had worked out a complex leaf-lettuce hybrid involving half-a-dozen strains (including even wild lettuce) which was very deliberate about bolting. This they named, appropriately, "Slobolt"; it was just about ready for general release when the Ascension island installation was set up.

At hydroponic gardens lettuce is not harvested by lifting a whole plant at a time, in the customary fashion. To make each plant produce just as long as possible, each leaf is cut off separately, leaving the central stalk. This grows new leaves, which are again harvested in the same manner. As many as four crops of leaves can be gathered before production falls off and the plant has to be pulled up.

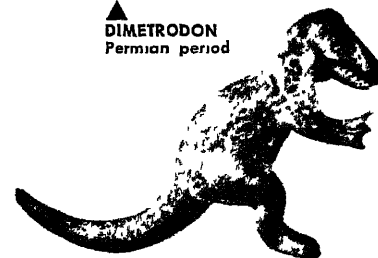
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A former "mystery animal," whose simplest name is Meniscotherium, is now better known to scientists, thanks to fossils found in New Mexico; the one-foot-high animal is, perhaps, a "relative and forerunner of monkeys."

The best Chinese lacquer is said to be produced on junks lying out at sea so as to avoid dust, and to give it better drying properties which are aided by humidity.

Puffed-cereal breakfast foods are now being produced in Chile by a former Chilean diplomat who learned the know-how and bought the needed machinery while on duty in the United States.

The Eocene period in geological time is the "Dawn of the Recent," when dinosaurs had become extinct and the earth became overrun with smaller but smarter warm-blooded animals, mammals.

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extent by greenhousemen in this country, but principally for cut flowers and other high-revenue crops. It will be interesting to see what will be the effect

RADIO

New Navigation Receivers

Pilots will receive very high frequency signals to guide them to destination and also give distances and other navigation information.

► NEW VERY high frequency navigation receivers for airplanes were revealed by Bendix Radio, Baltimore, in connection with the Bendix Trophy Race from California to Cleveland, Ohio. They are for use with the Civil Aeronautics Administration's very high frequency (VHF) radio ranges now being installed throughout the country.

These new receivers have passed the development stage and will be in production this fall. They are of what is known as the omni-directional navigation type. To use the VHF radio ranges now being established by the CAA, special receivers are necessary. These radio ranges are guide paths which pilots follow to take them safely along their skyways. The new CAA radio ranges are known as omni-directional ranges, ODR for short. VHF is replacing the ordinary radio waves, the "beams" which pilots have followed in the past, because VHF is static-free.

The ODR is expected to decrease errors in navigation, and to give the pilot visual indication on his instrument panel of complete navigational information. Direction to the station will always be known, distances will also be given by an allied installation.

The new Bendix VHF omni-directional range navigational devices are designed to permit maximum use of the new ODR radio facilities. The receiver is a crystal-controlled superheterodyne which will tune to any channel used in the ODR. By means of its monitor system, crystal-controlled operation on 280 channels is possible with 21 built-in crystals.

In connection with the CAA's omni-directional system an instrument for measuring angles is employed. It is called a goniometer, and a special type is being made by the Bendix company.

With this device a portion of the radio frequency energy from the transmitter is fed through it to the antenna, the

on American horticulture of the large-scale experience which Army men have been acquiring.

Science News Letter, September 6, 1947

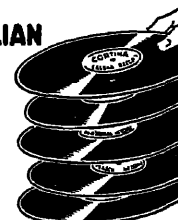
rest going directly to the antenna system. It is this combination of energy in the antenna system that produces the effective 360-degree rotation of the VHF beam which results in the variable phase signal at the receiver in the airplane.

Science News Letter, September 6, 1947

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Sold Down the River

➤RECENTLY New York papers carried news items about the destructive operations of "topsoil strippers" on Long Island. If you have an estate that lacks good soil and still want a garden, these vendors will buy fertile topsoil off a farmer's fields or from the owner of unused land, and truck it over to your place. The price paid is good, and everybody should be satisfied.

But everybody isn't satisfied. When a man sells his topsoil he is marketing some of his neighbors' rights as well: the right to live in dust-free country air; the right to freedom from weed seeds, drifting in from land left fallow; the right to assurance that the property next to yours won't become a gullied rural slum, dragging down the value of your own land with it. So the neighbors have been protesting, and several communities have legislated against this particular abuse.

This indignation at landowners' reckless selling of their own birthrights, together with the collateral rights of others, is praiseworthy and an evidence of Americans' ability to take effective community action when they plainly see that community interests are threatened. It would be immensely more cheering, however, if the country at large could be similarly aroused to action over the less spectacularly evident but vastly more damaging loss of topsoil through erosion resulting from bad farming, pasturing and lumbering methods.

The Long Island traffic in topsoil does not result in a total net loss—at least not immediately. The soil carted away is dumped and smoothed out and made into gardens somewhere else. But the soil that is permitted to wash down the

silt-choked rivers, or to drift down the wind in dust-storms, finds no new abiding place, except as stinking mud left when flood-waters recede or as thick layers of gritty stuff after the dark wind dies down.

Despite some slight improvements following years of effort by such missionaries of science as H. H. Bennett and W. C. Lowdermilk, wholesale abuse of our land still goes on. Millions of Americans still sell our common birthright down the river, not even for a mess of pottage and the doubtful blessing of a blind patriarch; they sell it only for the eventual curses of generations yet unborn.

Science News Letter, September 6, 1947

ASTRONOMY

No Heat Waves Exist On the Other Planets

➤THAT hot-weather bore who tells you he always slept under two blankets in the vacationland he's just got back from might be a good candidate for the first rocket-trip to Mars—preferably on a one-way ticket. Midday temperatures there get up to about 50 degrees Fahrenheit, it begins to freeze at sunset, and before morning the thermometer would read 50 below. Or you might even want to send him out to Jupiter or Saturn, where it never gets warmer than 216 degrees below zero.

Inhospitality of other known planets to life as we know it was brought out in detail in a talk by Rev. F. J. Heyden, S.J., director of the astronomical observatory at Georgetown University. Father Heyden spoke as the guest of Watson Davis, director of Science Service, on Adventures in Science, over the Columbia Broadcasting System.

There are other reasons, too, why human beings would never choose other planets as summer resorts. Mars, for example, might supply lots of sand, but probably couldn't offer much in the way of beaches. For long-range studies of our nearest planetary neighbor's atmosphere show that it has only about one-twentieth as much water vapor as the earth's. The whole atmosphere, as a matter of fact, is much thinner than ours, and the surface of the planet is largely a red desert.

Venus, circling the sun just inside the earth's orbit, has a much denser atmosphere and apparently a continuous canopy of cloud. But as nearly as can be determined, the atmosphere consists almost entirely of carbon dioxide, and the clouds

are made of droplets of liquid formaldehyde. There is no water, no free oxygen.

Closest to the sun, Mercury has no atmosphere at all. The same side of this smallest of the planets is always turned towards the sun, so that it is certainly a seared and blistered cinder, while the side that is always in shadow has a temperature close to that of dry-ice, or solid carbon dioxide.

The giant planets Jupiter and Saturn, in the suburbs of the solar system, are not only always terribly cold because of their great distance from the sun, their atmospheres appear to consist mainly of ammonia vapor and methane or marsh-gas.

For these and other reasons, Father Heyden concluded, the only legitimate places for inhabitants of other planets are "in fairy tales, adventure stories and comic books"

Science News Letter, September 6, 1947

Principal food of natives in the high Andes consists of potatoes, both wild and cultivated.



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CHIPPEWA VILLAGE: The Story of Kautitegon—W. Vernon Kinnierz—*Cranbrook Inst. of Science*, Bulletin 25, 259 p., illus., \$3. A contrast of new and old, being a story of life in this conservative community along the Michigan-Wisconsin border where life differs from that of a Chippewa village of the past but is not identical with that of their non-Indian neighbors.

DIRECTORY OF ASTRONOMICAL OBSERVATORIES IN THE UNITED STATES—Mabel Sterns—J. W. Edwards, 162 p., illus., paper, \$2.85. This directory lists the astronomical observatories in the U S, giving name, location, ownership, and description. It is divided into two sections: observatories other than those of astronomical societies and those of astronomical societies.

ENGLISH-SPANISH CHEMICAL AND MEDICAL DICTIONARY—Morris Goldberg—*McGraw-Hill*, 692 p., \$10. Translations and definitions in Spanish of more than 40,000 of the most important terms of medicine, surgery, pharmacy, chemistry, dentistry, veterinary biochemistry, bacteriology and related sciences.

PROCEEDINGS OF THE AMERICAN SOCIETY OF SUGAR BEET TECHNOLOGISTS—*publ. by the Society*, 684 p., illus., \$5. This contains the proceedings of the Fourth General Meeting held in 1946 which comprise numerous technical papers on all phases of sugar beet production and sugar production from sugar beets.

PROCEEDINGS OF THE RESEARCH FORUM AT ENDICOTT, N. Y., AUGUST 1946—*Int. Business Machines Corp.*, 94 p., paper, free. A collection of papers read at the forum for the purpose of informing those persons interested in machine methods of psychological research and statistical procedures to learn of the techniques developed during the war years.

THE SANTA FE TRAIL: The Opening of the West—Editors of LOOK—*Random House*, 271 p., illus., \$3.50. Focused on the Santa Fe Trail, this pictorial history of one phase

of the opening of the West emphasizes the courage and endurance necessary for survival during a picturesque period in American history.

THIRTIETH ANNUAL REPORT OF THE NATIONAL RESEARCH COUNCIL OF CANADA 1946-47—*publ. by the Council*, 27 p., paper, free. A general indication of the work of the National Research Council, the nature and variety of the hundreds of projects under investigation in the several divisions.

Science News Letter, September 6, 1947

MEDICINE

New Policy on Insurance Needed for Syphilitics

➤ A NEW policy for deciding whether a person with syphilis should be accepted or rejected for life and disability insurance is needed, Drs. Joseph Earle Moore of Baltimore and Ira Leo Schamberg of Philadelphia declare. (*Journal, American Medical Association*, Aug. 30)

Penicillin and other modern methods of treating syphilis, plus recent reports on mortality from syphilis, are among factors which make a new policy on insurability of syphilitics necessary.

At the request of the Veterans Association, the two physicians have prepared suggestions for revision of policy which will be of equal interest to commercial life insurance companies.

No applicant with untreated syphilis in any stage should be granted insurance if, as with commercial companies, the applicant must demonstrate good health. If treatment has been given it should have been adequate.

An applicant with untreated syphilis in any stage should be granted insurance if he has been treated within two years of getting syphilis and tests of blood and spinal fluid were negative for two or more years after treatment.

Suggestions to accept or reject applicants are based on the type of syphilis and the treatment and results of it in the individual applicant.

When the disease has attacked either the liver, stomach, heart, blood vessels or, in certain cases, the central nervous system, the recommendations are to reject the applicant for both life and disability insurance.

The recommendations are based on various facts now known about syphilis

and its treatment, among them the following:

Acquired syphilis is a chronic disease which seldom if ever kills within the first two years after it is acquired.

At least 95% of all deaths from acquired syphilis are due to one or a combination of three causes: 1. syphilis of the heart and blood vessels; 2. syphilis of the central nervous system; 3. hazards of treatment with metals (arsenic) and fever.

The probability of eventual development of syphilis of the central nervous system, in the form of paresis or locomotor ataxia, for example, can be fairly accurately predicted any time after the second year of infection by routine examination of the spinal fluid. The probability of syphilis of heart and blood vessels, however, can not be accurately predicted in the early days of the infection.

Untreated acquired syphilis is not necessarily a fatal or even a serious disease. In at least 50% there is no apparent effect on individual health. In only about 25%, potentially fatal late forms of the disease develop.

Science News Letter, September 6, 1947

Sheep are rapidly and effectively sprayed in a sheep tick control program by driving them through a rectangle of pipes lined with nozzles which shoot spray on them from the top, bottom and both sides.

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⚙️ **ALUMINUM LININGS** for household skillets and baking pans are discarded after a single use and save the drudgery of scouring out the used utensil. The shaped linings, made in sizes to fit standard skillets, are of non-absorbent, non-inflammable, highly burnished aluminum foil.

Science News Letter, September 6, 1947

⚙️ **SAMPLE COLLECTOR** is a vacuum device with a suction hose that draws ore cuttings out of a hole being drilled into the earth while the drill is in operation. It is a U. S. Bureau of Mines device, and is used with the ordinary drill wagon employed in mineral exploration.

Science News Letter, September 6, 1947

⚙️ **WATER SOFTENER**, for home use, consists of a two-foot high plastic tank piped into the water line and through which the water passes. Within is a synthetic mineral filter which removes from the water the mineral salts that cause hardness. The plastic is tasteless.

Science News Letter, September 6, 1947

⚙️ **JACK** for forcing warped boards into tight-fitting position in floors or sidewalls has an anchor head that may be fixed to a joist or stud with a tap of a hammer, and lever action to squeeze the boards together and hold them for nailing. It can be used also to align bent joists.

Science News Letter, September 6, 1947



⚙️ **MICROPHONE-TRANSMITTER**, containing its own electric power, sends speech through the air to radio receivers up to 75 feet away. It utilizes a radio frequency oscillator modulated within the microphone. The portable "mike" can be placed wherever wanted, and used for intra-plant communication or home entertainment.

Science News Letter, September 6, 1947

⚙️ **TELEVISION KIT**, for final assembly in the home by the purchaser, contains all the component parts except tubes. Instructions for assembly accompany the kit. It is in two sizes, a seven-inch and a ten-inch telekit, both at a reasonable cost.

Science News Letter, September 6, 1947

⚙️ **MAGIC LASSO**, which anyone can quickly learn to spin, is "safe" in the hands of children and will satisfy the longings of those who have seen the lasso spun in movies or circus. It is a hand-finished sisal rope, fitted with a tiny embedded swivel to permit free spinning of the loop.

Science News Letter, September 6, 1947

⚙️ **HOME SHOP** power tool has attachments that permit it to be used either as a circular saw or a jigsaw, and also for sanding, grinding, buffing and shaping. It has a rugged cast-iron base, steel drive with ball bearings, and a removable saw table of aluminum.

Science News Letter, September 6, 1947

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Things of science

Membership is strictly limited to 10,000 and will be for at least the next nine months. This is America's most unique "club"

Each month you will receive a blue package of actual scientific specimens—experiment with them, handle them, smell them, even sometimes taste them. Clip this address label and mail with \$4 check today for year's membership.

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SCIENCE NEWS LETTER

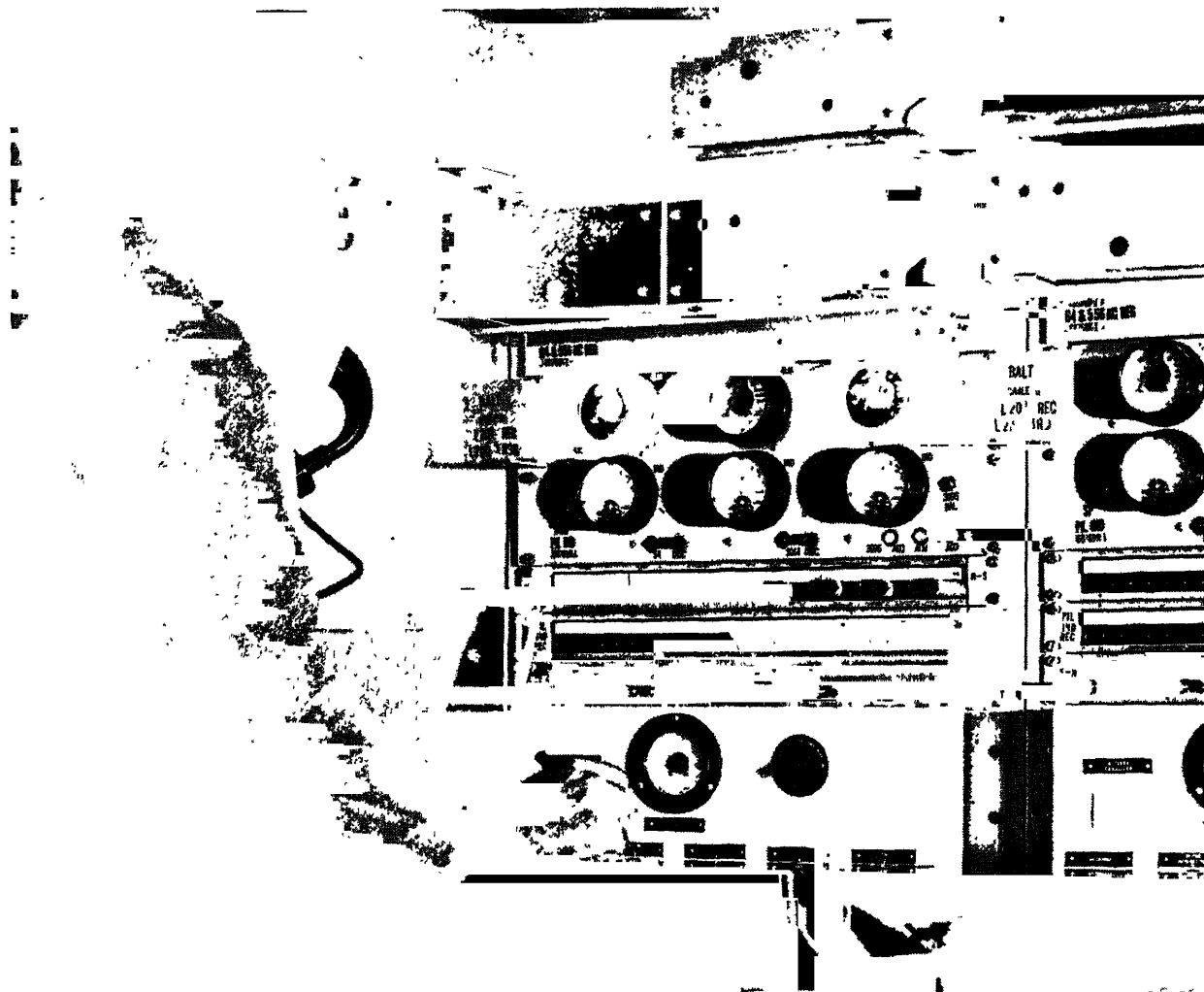


Vol. 52, No. 11

THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPT. 13, 1947



A SCIENCE SERVICE PUBLICATION



At Philadelphia, a testboard man answers as an electronic watchman calls attention to conditions on a coaxial system to Washington.

"Send Help to Manhole 83"

Strung out along every Bell System coaxial cable, electronic watchmen constantly mount guard over your voice. Some are in manholes under city streets; some are in little huts on the desert. Most situations they can deal with themselves; if things threaten to get out of hand, they signal the nearest testboard.

Principal care of the electronic watchman is the transmission level. Sun-warmed cables use up more energy than cold ones, so a trans-continental call may take a million-fold more energy to carry it by day

than by night. Each watchman — an electronic regulator — checks the transmission level and adjusts the amplification which sends your voice along to the next point. Many hundreds of regulators may be at work on a single long distance call.

Without automatic regulation, the precise control of energy in the Bell System's long distance circuits would be a superhuman task.

So Bell Laboratories, which in 1913 developed the first high-vacuum electronic amplifier, went on to devise the means to make them

self-regulating in telephone systems. This is one reason why your long distance call goes through clearly, across the state or across the nation, summer or winter.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for continued improvements and economies in telephone service.



MEDICINE

Blood Tests for Cancer

May be steps toward goal of a method of diagnosing cancer in its early, curable stages. One uses dyes which change color with cancer; other uses ultraviolet.

➤ TWO BLOOD TESTS for cancer being announced at the International Cancer Congress in St. Louis promise to lead to the long-sought goal of a test to diagnose cancer in its early, curable but too often unsuspected stages.

One of them even now is suggested as a "valuable screening agent," meaning that it might be used to separate cancer from non-cancer patients somewhat as X-rays are used to screen TB patients from non-tuberculous patients in a community.

This screening agent test was devised by Dr. Maurice Black of the Brooklyn Cancer Institute and New York Medical College. It is made with two dyes, brilliant cresyl blue and methylene blue. A little of the dye is added to a little blood plasma in a test tube and the tube put in boiling water. If the patient has cancer the brilliant cresyl blue, at the end of ten minutes, will have turned to lavender and the plasma and dye will form a clot. If the patient does not have cancer, this clot will be grayish-white. The methylene blue is completely decolorized in less than ten minutes if the patient does not have cancer. If he has cancer, it takes his blood plasma more than ten minutes to decolor the dye.

In 681 cases the test had an accuracy

of 86%. It was 100% accurate in normal patients, 92% accurate in patients sick of other diseases than cancer, 83% accurate in harmless tumors, and 80% accurate in cancer.

The second blood test was devised by Dr. Louis Herly of Columbia University, New York. It is made with ultraviolet light. Normal blood serum seen under filtered ultraviolet is turbid and glows with fluorescence. Blood from animals and humans with cancer fails to glow and is clear. When the cancer has been removed by surgery, the blood serum is again turbid and glowing under the ultraviolet light. When the cancer has been treated by X-rays, radium or nitrogen mustard, the serum has a murky, bluish color under the ultraviolet light.

In animals, when cancer cells are injected into their bodies, the cancer that develops cannot be seen until five days later. But their blood serum shows the presence of cancer by this ultraviolet test within 20 to 43 hours.

Dr. Herly developed this test as a result of earlier work that started with using ultraviolet light to trace the course of fluorescent cancer-causing chemicals through the body of rats as cancer developed.

Science News Letter, September 13, 1947

life span. All became extinct after a limited number of generations. Lines of parental age younger than that at which growth ceases showed progressively longer life spans and are free of any age change.

The length of life of rotifers could be markedly increased by treatment with sodium citrate which removed calcium from their cells, Dr. Lansing found in other experiments.

Cancer tissue is markedly low in calcium, scientists have repeatedly shown. A calcium deficiency in cancer cells has recently been reported as the reason for a decreased stickiness of the cells. The decreased stickiness makes separation of one cancer cell from another easy and may be part of the reason for the spread of cancer through the body.

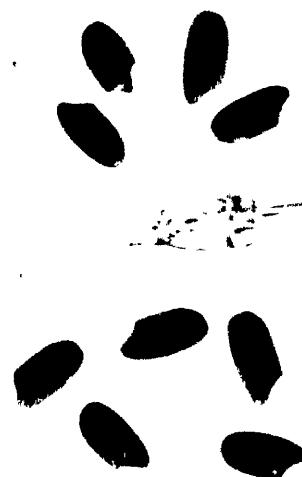
These findings on cancer are what could be expected if little calcium in the cells is a mark of young, vigorous growth.

Science News Letter, September 13, 1947

RADIO

Rice-Grain Size Tube Developed for War Uses

➤ A RICE-GRAIN size radio tube has been developed by the National Bureau of Standards, it was revealed. It is believed to be the smallest tube ever made.



RICE-GRAIN TUBE—This micro-tube, photographed here with grains of rice, is the world's smallest known radio tube. It was developed at the National Bureau of Standards.

MEDICINE

Cell Shell Is Cancer Clue

Hard-shelled body cells are linked with aging; soft-shell with cancer. Calcium and an unknown chemical makes the difference.

➤ HARD-SHELLED cells are linked with aging of the body. Soft-shelled body cells are linked with cancer. Calcium, the mineral that makes bones and teeth hard, and an unknown chemical in the cell that binds calcium to itself and the cell make the difference between aging, hard-shelled cells and young, vigorously growing cells of youth and cancer.

This, briefly, is the picture of cancer and the aging process evolved by Dr. Albert I. Lansing of Washington Uni-

versity of St. Louis and Barnard Free Skin and Cancer Hospital in St. Louis.

The theory is based on studies by himself and numerous other investigators, he points out. (*Science*, Sept. 29).

The stopping of growth is a critical turning point in the starting of age changes, Dr. Lansing found in studies of rotifers, microscopic worms that live in stagnant water.

Successive generations of these worms were traced. Lines of old parentage showed a progressive decline in mean

Limiting age

This microtube, as it is called, has various military applications. Therefore no details relative to it are revealed. It grew smaller through a process of evolution. Scientists of the Bureau first made a tube about one quarter of an inch in

diameter. They found that design simplifications to get that far made even further reduction in size possible. The result is the new tube, which is slightly larger than an ordinary grain of rice.

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ASTRONOMY

Sun Million Degrees Hot?

Observations with "snooperscope" and "sniperscope," show that sun produces much more energy than would be expected from lower temperatures.

➤ ASTRONOMERS have trained the eye of the wartime snooperscope upon the infra-red "heatshine" of the sun and discovered that the sun is producing much more energy than can be expected from the extent of its supposed temperature.

Probably the most important astronomical advance of the year, the American Astronomical Society meeting in Evanston, Ill. heard a group of scientists from the University of Michigan's McMath-Hulbert Observatory tell how they had penetrated a region of the sun's radiation never before adequately explored.

They used a sky-observing variation of the famous snooperscope, sniperscope and infra-red signaling devices that GIs used in spotting unsuspecting Japs. This consists of a lead sulfide photocell sensitive to heat or infra-red radiation. The cell used in solar observation has a hundred times the sensitivity of the best heat-measuring thermocouple used by astronomers heretofore. With this solar snooperscope, the astronomers are able to chart in detail the deep infra-red solar spectrum that is unreachably with ordinary photographic plates sensitive to visible light.

"There must be some way in which the sun is producing a great deal more energy than one would expect from its apparent surface temperature," Dr. Leo Goldberg of the University of Michigan told the astronomers. He concluded this from a startling discrepancy observed between the infra-red spectrum lines caused by iron atoms and the prediction from currently accepted theory. The iron atoms in the sun's lower atmosphere could not produce the snooperscope effect observed if they were at a mere temperature of 4800 degrees absolute temperature now assigned them. Esti-

mates of million-degree temperatures in the sun's corona fit in with the new observations.

Since the sun's heat is produced by a cycle of atomic energy involving helium, hydrogen, carbon and other light elements, the new observations will probably give rise to new speculation concerning this solar conversion of mass into energy.

Oxygen and water vapor in the earth's atmosphere blanket the earth and prevent visual observation of the sun's spectrum in the infra-red region. Beginning at about 11,000 Angstroms (units in which radiation is measured) and extending to 15,000 Angstroms, the solar spectrum consists mainly of absorption bands of molecules in the earth's atmosphere.

Dr. Arthur Adel of the Michigan team and pioneer in infra-red observation, reported the identification of new atomic lines between 15,000 and 16,000 Angstroms which cannot be duplicated here on earth.

Dr. Robert R. McMath, director of the McMath-Hulbert Observatory which has two towers continuously observing the sun, and Dr. Orren C. Mohler told how new equipment, using mirrors exclusively instead of lenses, will extend the infra-red observations out to about 40,000 Angstroms this winter.

The lead sulfide cell developed by Dr. R. J. Cashman of the Northwestern Technological Institute has its range limited now to about 20,000 Angstroms by having to work with radiation that passes through glass which screens out some of the heat bands.

Science News Letter, September 13, 1947

From July until October, when the water is warm, lobsters move into Maine bays and river mouths but return to the sea when the water begins to cool.

METALLURGY

Gold and Copper Used in Solder

➤ GOLD and copper are alloyed to make a special-purpose solder by Dr. Richard B. Nelson, a General Electric Company research physicist. Preferred proportions are 37.5% gold, 62.5% copper. The solder is used on such difficult metals as copper and iron-nickel-cobalt alloys. Also, because its expansion characteristics are close to those of glass, it is well suited for making high-vacuum seals between glass and metals. Patent 2,426,467 has been granted on Mr. Nelson's solder.

Science News Letter, September 13, 1947

SCIENCE NEWS LETTER

Vol. 52 SEPTEMBER 13, 1947 No. 11

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N. Y. C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439.

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PHYSICS-MEDICINE

Export Atom Pile Chemicals

As contribution to international defense against cancer, the United States will send abroad radioactive chemical elements, by-product of bomb.

➤ TO AID the fight against cancer and other disease foes of mankind, the United States will export radioactive chemical elements manufactured in the uranium chain-reacting pile that produced the atom bomb.

Announcement of this "important forward step toward greater international cooperation in the field of medical and biological research" was made in a telegram from President Truman to Dr. E. V. Cowdry, president of the International Cancer Research Congress meeting in St. Louis.

Thus, while the method of making the atom bomb remains a closely guarded secret, the United States will share its greatest peacetime byproduct with the world.

In his telegram of announcement, President Truman said: "I know that the representatives of the United States attending the Cancer Research Congress share my hope that the open, impartial, and truly international character of medical research will carry over into the realm of other problems of world concern. The sharing by and among all nations of both the means and the results of cancer research will reduce the loss of life and human suffering from disease throughout the world."

The production of radioactive chemicals at the Clinton Laboratories, operated by Monsanto Chemical Company, has now reached the point where the 20 most important of these chemicals can be made available in limited amounts and at reasonable cost to qualified users outside of the United States, Atomic Energy Commission officials decided. More than 1,200 shipments of some 90 such chemicals have been made to more than 160 institutions throughout the United States in the past year.

Foreign governments whose research workers request radio-isotopes must first agree:

1. To make progress reports to the United States Atomic Energy Commission every six months on the results of the work with the isotopes and to permit publication of the reports.

2. To insure that the radioisotopes are used for the purpose stated in the requests, which must be approved by the Commission prior to shipment in the same manner as domestic requests.

3. To permit qualified scientists irrespective of nationality to visit the institutions where the materials will be used and to obtain information freely with respect to the purposes, methods and results of such use, in accordance with well established scientific tradition.

The 20 radioactive chemical elements, or isotopes as they are termed, are: antimony 122, 124, 125, argon 37, arsenic 76, 77, bromine 82, calcium 45, carbon 14, chlorine 36, cobalt 60, copper 64, gold 198, 199, iodine 131, iron 55, 59, mercury 197, 203, 205, phosphorus 32, potassium 42, silver 108, 110, 111, strontium 89, sulfur 35, sodium 24, and zinc 65, 69.

Besides cancer research, they may be used in studies ranging from venereal diseases to the action of insulin

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AERONAUTICS-ENTOMOLOGY

American Helicopters Fight Locusts in Argentina

➤ HELICOPTERS of American make have proved their worth in combat in Argentina recently—though not against any human foe. Instead, the foe was an enemy of the whole human race—locusts, that devour grain, pastures, all edible things in the paths of their miles-wide, miles-long swarms.

Helicopters flying through or over the air-borne hordes spray them with a commercial preparation of dinitro-orthocresol. Contact is immediate and effective, it is reported; a 98% kill of the insects is claimed.

This first use of helicopters in South American insect warfare was made under the command of C. J. Tippet, technical director of Trabajos Aereos Y Representaciones (TAYR), using craft built by the Bell Aircraft Corporation. In all, 11 helicopters have been delivered for this purpose.

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KILLED BY HELICOPTER—Victims of the helicopter, now waging war against an enemy of all mankind, these locusts lie dead on the ground near Parana, Argentina. The helicopter, of U. S. make (Bell), is used to scatter a killing dust in the clouds of locusts as they fly.

GENETICS

Chestnuts Come Back

Trees, almost all killed by Oriental pest, may be replaced by hybrid trees now being produced that are resistant to blight fungus.

See Front Cover

► LONGFELLOW'S poem, "The Village Blacksmith," meant a great deal more to our grandparents than it does to children of the present generation. Not only have blacksmiths vanished, but spreading chestnut trees are no more.

Blacksmiths vanished when automobiles replaced horses and buggies; their sons set up in business as garagekeepers and repairmen. But there was no such technological replacement in the case of the chestnut tree: it simply got killed by a fungus-caused blight. Beginning about the turn of the present century with a little focus of infestation around New York, this imported Oriental pest spread by leaps, until today all that are left of America's once beautiful native chestnuts are a few scattered sick trees in western Tennessee and northern Mississippi. Over great stretches of forest land in the eastern third of our country, barkless trunks still stand, for the excellent wood of the chestnut defies decay.

America needs new chestnuts. The nuts are pleasant eating for human beings and important food for such wildlife as wild turkeys, but that is the smallest part of the story. Bark and wood are about our most important source of tannin for making leather. The wood is useful also in places where resistance to decay is important, as in posts and ties, and (of all things!) coffins. At present, much of our tannin requirement is met by "mining" the dead stands of blight-killed chestnuts; but these, of course, cannot be expected to last indefinitely. Replacements must be arranged for.

Blight-resistant chestnut species have been brought in from the Orient, where the blight itself came from. Presumably blight-susceptible trees in China and Japan died off long ago; the survivors represent the product of a natural selection. The Brooklyn Botanic Garden pioneered this work, but lately greatest activity in seeking blight-resistant trees has been on experimental plots a short distance outside Washington, D. C. There two pathologists of the U. S. Department of Agriculture, G. F. Gravatt

and Russell B. Clapper, are making all kinds of hybrids between the most promising Chinese chestnuts and chinkapins and American chestnut sprouts that spring up from the roots of dead trees and survive long enough to produce a few blossoms—sometimes even a few nuts.

Male or pollen-producing and female or seed-bearing flowers are borne in clusters, separately but on the same tree. Since the two sexes mature at slightly different times there is small chance of self-pollination. To insure the desired crosses, branch-ends are bagged and "intruder" pollen thus excluded. Pollen from the chosen male parent is collected, usually by simply picking off one or more of the beautiful yellow male catkins, and the fertilizing grains transferred to the receiving surfaces of the inconspicuous green female flowers. Then the bag is tied on again until the nut-containing burrs begin to form.

The picture on the front cover of this week's SCIENCE NEWS LETTER shows how the pollen-bearing male flowers are carried to the female flower for cross-pollination as well as how the pollen grains are transferred. The cover photograph and those on this page were made by the Science Service staff photographer, Fremont Davis.

Some fairly promising resistant hybrids have already been obtained, but the researchers are not satisfied, and



CROSS-POLLINATION—The pollen from the male flowers is placed on the pistils of the female flowers, which are then protected against accidental pollination by paper bags. See cover for closeup.

intend to keep on trying. When they finally succeed in getting what they want they will have also the added advantage of hybrid vigor in their trees. This is the curious property in hybrids, not at all well understood as yet, that causes many of them to be faster-growing, bigger and more prolific than their parents. It is one of the things that has made hybrid corn such a success in this country; now we are to see it in trees.

Science News Letter, September 13, 1947

ENGINEERING

Inspection by Supersonics

In method comparable to radar, echoes of high-frequency sound show up tight cracks in metal not likely to be found by X-ray techniques.

► IMPROVED methods of locating flaws in large metal forgings by means of high-frequency sound waves can be used with parts too thick to be successfully X-rayed, the American Institute of Electrical Engineers meeting in San Diego was told by Donald C. Erdman of Burbank, Calif.

Supersonic inspection, as he called the process, will detect tight cracks which

are not likely to be found by X-ray methods, although X-ray has quite an advantage in being able to show defects in such a manner that the type can be more easily identified, he said.

He likened the method to the echo techniques used in radar, in which electric impulses are reflected back by obstacles to the antenna from which sent. When high-frequency sound waves

are sent through metal, waves that hit a hidden flaw within it are reflected back.

In the method described by Mr. Erdman, a small quartz crystal is used as a transducer, a device to convert electrical energy into pressure waves, or returned pressure waves into electrical energy. Extremely short blocks of radio frequency power are fed to the transducer, with intervals between the blocks to permit the receipt of returned waves if there are any.

In inspecting small metal objects, the quartz crystal and casting are separated

but both placed under water. This permits the supersonic beam to be directed into fillets and curved surfaces, he said. When large objects are being inspected, their surfaces are usually flat enough to allow the quartz crystal to be placed directly against the parts.

There is no well-defined limit to the thickness of a part that can be inspected by supersonic means, Mr. Erdman stated, providing the metal is homogeneous, and the proper frequency and power are used.

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MEDICINE

Clue to How Cancer Kills

Cancer, at least in mice, picks up nitrogen from protein food and holds it trapped so that body can't use it. With nitrogen gone, the body dies.

► **DISCOVERY** of a clue to the unsolved mystery of why cancer kills was announced by Drs. G. B. Mider, H. Tesluk and J. J. Morton of the University of Rochester School of Medicine at the International Cancer Congress in St. Louis.

The clue is that in mice, and probably in humans, the cancer acts as a nitrogen trap. Nitrogen is an essential chemical for all protein tissue in the body. Muscle is the most familiar but by no means

the only such protein tissue. The body gets this nitrogen from protein foods, such as meat, milk and eggs. But the cancer may take more of this than the diet provides.

It robs the body of its stores of nitrogen, and it holds this trapped, so that the rest of the body cannot use it. With its nitrogen gone, the body dies.

This theory, based on studies in mice, would explain why patients with cancer, especially in the last stages, lose weight and get very thin. Rats with cancer lose about 30% to 40% of their carcass weight, that is, of the weight of the body exclusive of the weight of the cancer.

As the cancer grows larger, the demands for nitrogen exceed the supply from the diet. The cancer gets the chemical at the expense of the body. Death comes when the body tissues cannot supply further nitrogen.

The situation is "like a motor which must supply power to machines," Dr. Mider explained. "The motor works well at its rated horsepower. It can function efficiently with some excess load. But if the load continues to increase, the motor will fail. The motor will also fail if its own source of energy is seriously impaired."

So far the findings apply only to one kind of cancer in mice under one set of experimental conditions. More studies are needed to confirm the theory and

extend it to cover cancer in man. But scientists hearing the report believe it may explain many things about human cancer not now known.

For example, patients sometimes live for many years with cancer in their bodies before it finally kills them. Doctors are seeing more and more of such cases, now that surgery and X-ray have become more efficient in eradicating the primary cancer. Deaths are more frequent now from cancers that have spread from the original one.

At first these spread cancers, called metastases, give no sign of their existence. It may be years before they grow to the point of killing the patient. If these spread cancers were ordinary scar tissue scattered widely through the body, the patients would be alive and well.

Some ways in which cancer kills are already known. It may kill by interfering with the function of a vital organ or by causing hemorrhage or ulcers which get infected and then the patient dies of the infection. But injury and other non-cancerous conditions may kill by the same means. The killing effect of cancer itself is not understood unless the nitrogen trapping action explains it.

Science News Letter, September 13, 1947

PLANT PATHOLOGY

Streptomycin Rids Seeds Of Disease Bacteria

► **STREPTOMYCIN**, the white hope against white plague in human beings, may also prove the salvation of seeds from bacterial plagues that lurk in their coats, ready to attack the young plants as soon as they emerge. In laboratory tests with a dilute streptomycin solution, Dr. Peter A. Ark of the University of California was able to rid cucumber seed of blight germs that would otherwise have proven fatal.

Other bacteria that attack plants yielded to streptomycin treatment. They included germs that cause blight in carrots, beans and pears, several leaf-spot diseases, tomato scab and tomato canker. Crown-gall bacteria and the fungi of pea blight and squash wilt resisted the drug.

Medicinal streptomycin is too costly at present for use in seed treatment, but Dr. Ark suggests the possible use of a less refined form of the drug, which could be made more cheaply.

Science News Letter, September 13, 1947



CANKER—This is the deformity caused by the blight fungus in the trunk of a young chestnut tree. Russell B. Clapper, researcher of the U. S. Department of Agriculture, inspects the extent of the injury.

IONOMY

**Establish World Center
in Minor Planets**

SO FAR as minor planets are concerned, Cincinnati Observatory has been the center of the solar system. The International Astronomical Union has designated it as the world's collecting and distributing center for observations on asteroids or minor planets.

Astronomers from all parts of the world will send to Cincinnati observations, ephemerides, and new discoveries, which will then be bulletined by wire, cable and mail to all observatories.

Cincinnati Observatory, headed by Dr. Paul Herget, will thus serve the same function with regard to minor planets as Harvard College Observatory, Cambridge, Mass., does in the distribution of general astronomical data by means of its famous series of announcement cards and telegrams.

Science News Letter, September 13, 1947

CHEMISTRY

**Chemistry Helps to Locate
Hidden Minerals in Ground**

CHEMISTRY is now playing an important part in helping locate hidden minerals in the earth. In the relatively new process, surface waters and certain parts of plants are analyzed to determine mineral compounds within them. The results indicate the chemical composition of underlying ore bodies.

The process is known as chemical or biogeochemical method. It was described in a recent issue of *Mining and Metallurgy*, a publication of the American Institute of Mining and Metallurgical Engineers, by Kalervo Rankama of the geology department of the University of Chicago. He described also the detection of mineral ores by the existence of indicator plants. This is the geobotanical method.

These methods, he stated, may provide geologists with far more information on the chemical composition of ore bodies and provide a more direct method for prospecting and locating ore bodies of specific metals than have the detailed examination of surface rocks and the results of various geophysical methods.

Principles behind the methods are simple. All minerals are soluble in water to some extent, he said. Ground water passing on our body will dissolve the minerals in the soil. Consequently, the

be detected in the overlying soil, or in vegetation.

Copper-nickel ore in central Finland was located by Mr. Rankama by spectrographic analysis of the ashes of birch leaves growing in the vicinity. A distinct enrichment of nickel, he stated, was found present in plants growing in the immediate vicinity of the outcropping copper-nickel ore body in the northern area near Petsamo, formerly a part of Finland but now Russian territory.

Also, there are certain plants that grow best in the vicinity of certain mineral elements in the soil. Several ore deposits, discovered because of the presence of one or another of these plants, were mentioned by him.

Science News Letter, September 13, 1947

ENGINEERING

**Sectional Buses Adapted
To Wide Range of Uses**

SECTIONAL BUSES, introducing a new flexibility into traffic management, are offered under new U. S. patent 2,425,948, by Rene Lucien of Farnham Common, England.

According to his design, the forward section contains the operator's compartment, with steering gear and appropriate power controls. The rear section contains the engine and transmission; its wheels are the drive wheels. The middle section, normally unwheeled, is fitted with seats and baggage compartments.

The three sections are so arranged as to come apart readily, front and rear sections dropping retractable third wheels to permit their being moved away from the middle section, which is kept at proper height by hydraulic jacks fore and aft. Thus the control and power sections can be shifted from short to long passenger sections, as traffic may demand. To prevent an extra-long middle section from becoming swaybacked, extra wheels, which may be powered by a transmission shaft, can be fitted to it.

The control and power sections can be attached to mid-sections designed for other purposes, if desired. Thus the bus may become a heavy truck, a hopper truck for loads like grain, coal and gravel, a tank truck, etc. In time of war a number of them could make up a mobile battery, with open platform mid-sections mounting guns, searchlights, radar and computing apparatus. Unconverted buses could then serve as personnel carriers, and one or two might become mobile hospital units.

ENTOMOLOGY

**Mosquitoes' Flight Traced
By Fluorescent Dusting**

THE OLD gag about crossing mosquitoes with lightning-bugs so you could tell when they were coming has been realized for practical scientific purposes. The feat was not accomplished by an impossible genetic combination but by making ordinary mosquitoes shine in the dark. The beauty of it is that the mosquitoes don't know anything about it.

A scientist from India, Dr. Rajindar Pal, working at the London School of Hygiene and Tropical Medicine, wanted to follow the flight path of night-flying mosquito species, especially the ones that carry malaria and yellow fever.

He caged his insects in old-fashioned lamp-chimneys and gave them a few puffs of a fluorescent dust, that shines when the invisible rays of ultraviolet light fall on it. After the insects were released, he could follow them easily, no matter how dark it was, simply by turning the beam of an ultraviolet lamp on them.

A short technical report of Dr. Pal's experiments is presented in *Nature* (Aug. 30).

Science News Letter, September 13, 1947

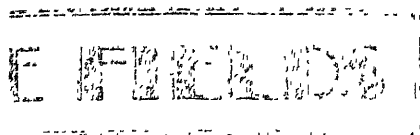
BOTANY

**Many "Coral" Beaches
Formed from Dead Seaweed**

THE GLEAMING, snow-white sand on thousands of tropical "coral" beaches is not made of ground-up coral at all but of tiny flakes of limy substance formed in the flat, leaflike branches of a green seaweed or alga, declare Drs. J. van Overbeek and Raymond E. Crist of the University of Puerto Rico.

This seaweed, known to botanists as *Halimeda opuntia*, forms great green sods on the shallow bottom just off shore. Pieces of it are constantly being wrenched loose by wave and current action. Cast ashore, they die and lose their green outer coating, leaving only the limy skeletons as flat flakes. Anyone who knows the plant in life can identify a beach that it has made by the shape of the flake-like limestone sand, state the two scientists.

Science News Letter, September 13, 1947



CHEMISTRY

Atomic Bomb Particles May Turn into Hydrogen

➤ A PREDICTION that spontaneous disintegration of free neutrons into hydrogen atoms would be discovered was made to the British Association for the Advancement of Science by Dr. O. R. Frisch of Britain's Harwell Atomic Research Laboratory. Neutrons are the fundamental particles that set off the fission of atoms in the atomic bomb. Hydrogen in the form of the proton which is its heart is another fundamental bit of matter of the same weight.

Study of the way neutrons scatter from inorganic molecules will show the position of the hydrogen atoms within them, Dr. Frisch also predicted. This should be of eventual industrial importance.

Science News Letter, September 13, 1947

MEDICINE

Deadly Atomic Disease Has No Human Victims

➤ A NEW, deadly disease of the atomic age was reported to the International Cancer Congress in St. Louis. It is named plutonium, for the element, plutonium, discovered in atomic bomb researches.

It has never attacked a human being. It probably never will, because of the care being taken to protect atomic energy workers. But hundreds of mice and rats in the Argonne National Laboratory, Chicago, have died of it. Dr. Hermann Lisco and Miriam P. Finkel of that institution reported their studies with this radioactive chemical.

Plutonium gives off all alpha rays. Compared to beta and gamma rays, these alpha rays have not been considered very dangerous. They are big particles, but they can penetrate only through short distances or thicknesses. If they strike the body from outside, they can hardly get through the skin. But within the body, concentrated in one place, they can cause great damage in that area.

This might make plutonium good treatment for cancer by localizing its rays at the site of the cancer. But the element has a half-life of over 20,000 years, which makes it too dangerous to

use. The cancer might be destroyed, but the chemical would go on emitting rays which would cause other cancers.

Time as well as the size of the dose of plutonium is important in the damage it does. It takes much longer for radioactive chemicals to cause cancer than for non-radioactive, coal tar chemicals.

A mouse has a short life compared to man. It may die before it gets cancer from radioactive material, but a man lives long enough to get the cancer, Dr. Austin M. Brues of Chicago pointed out. His studies show that it is absolute, not relative, time that is important in the development of cancer from radium or other sources of radiation. This absolute time factor may be important in connection with other causes of human cancer.

Science News Letter, September 13, 1947

METALLURGY

High Electrical Potential Warns of Beginning Rust

➤ WHEN painted metal surfaces rust in water solutions, some of their electrical properties change, F. Wormwell and D. M. Brasher, of the Chemical Research Laboratory, announced. (*Nature*.)

Describing their experiments, they explained that steel plates were abraded, degreased, and given two coats of anti-corrosion marine paint. A pair of these plates, in an upright position, was covered with artificial sea water, after an insulated wire had been attached to each.

Checking earlier workers, they first found the potential difference, or difference in electrical pressure, between the two plates. This is usually measured in volts. The potential, they pointed out, increased to a high point just before rusting began. Then it dropped slowly as rusted area increased.

Next they studied the change in the voltage needed to make current flow from one plate through the sea water to the other plate. This resistance became less as the area of rusting on the plates increased.

In a third experiment, the scientists measured the capacity, or the amount of electricity which the plates could hold. The capacity, they reported, increased as the steel plates rusted more. This change in capacity turned out to be the best method of measuring breakdown of paint films, they said.

Science News Letter, September 13, 1947

PHYSICS-PALaeONTOLOGY

Atomic Energy May Locate Hidden Fossils

➤ ATOMIC energy will be tested to obtain information concerning prehistoric man from certain limestone formations in South Africa. A University of California expedition outfitted in July will try out the method, the American Society of Mechanical Engineers was told by Robert Sibley of the university staff.

In these limestones, he said, are skulls and fossil remains that will have a great bearing in tracing the ancestry of man. It is expensive to dissolve out the limestone material to obtain them. If means could be found to photograph a piece of limestone so that any fossils in it could be known before expensive excavations are made, it would greatly facilitate the speed of this study and reduce the expense.

Experiments were conducted, before the expedition left for South Africa, using radioactive materials previously bombarded by the fast moving particles in the cyclotron. Means were found that will enable the scientists to acquire information on the fossils without ever having dissolved the enclosing media.

Science News Letter, September 13, 1947

ENGINEERING

Less Sugar Loss When Beets Are Stored Cold

➤ LARGE savings in sugar result from the storage of sugar beets at near freezing temperature while awaiting processing at the sugar mills, the American Society of Mechanical Engineers was informed by R. D. Barmington of the Colorado Agricultural Experiment Station, at Fort Collins.

Sugar losses in a stored pile of beets vary from one quarter to one pound per ton per day, depending upon the temperature of the pile, he stated. When a 60,000-ton pile of beets is stored, the loss of one pound of sugar per ton means a loss of 30 tons of sugar daily.

For best storage of beets, the temperature must be reduced from about 50 degrees Fahrenheit, the average temperature of the soil at harvest time in Colorado, to as near 32 degrees as possible without freezing. One cooling means suggested is artificial ventilation using night air, which is usually 35 degrees or lower during the storage season. The statements are based on experimental work at the Colorado station.

Science News Letter, September 13, 1947

MEDICINE

X-Rays Fight White Plague

Many modern treatments have been developed for tuberculosis but the X-ray is the most valuable weapon for detecting disease in early stages.

By JANE STAFFORD

► FRONT-LINE weapon against tuberculosis is the X-ray machine. In the half century since the discovery of X-rays, medical scientists have developed many ways of treating the white plague, from rest cures in a sanatorium to chest operations and streptomycin, the chemical from a mold.

But before the patient can be cured, he must be found—and this is not always easy. Contrary to popular impression, the patient with tuberculosis does not always present the appearance of a gaunt, feverish person with wracking cough and bloody sputum. In fact, the cough, the hemorrhages and similar spectacular symptoms usually do not appear until the disease has gone on for some time.

Very early stages of the disease, however, can be detected by X-ray pictures of the chest.

Medical authorities now hope that with the latest technological developments and the increasing use of the chest X-ray, they will be able to wipe out a disease that is killing more than tens of thousands annually. So health agencies throughout the United States are assembling their forces for one of the greatest battles in history—a war to the death against tuberculosis.

Mobile Units Touring

Day-to-day developments in the big battle ahead are being reported in the nation's press as mobile chest X-ray units move into various localities to make available to the populace the inexpensive, simple chest X-ray. Although the X-ray itself was discovered some 52 years ago, it wasn't until recent years that the inexpensive methods were developed to a point where it was possible to bring this simple health check to every man, woman and child.

- The pioneer mass chest X-ray service in this country was the rapid method of using paper film in roll form, first used by the Queensboro Tuberculosis and Health Association of Queens County,

N. Y., in 1931. Advantages of this system are its high speed, allowing more than 150 persons to be X-rayed per hour, the low overall cost of the full-size 14 x 17-inch radiographs, and the high diagnostic quality and accuracy of the film.

In recent years further developments in chest X-ray equipment have produced mobile units—using 14x17 paper, and 35-mm. and 70-mm. films—that can be moved into any place, any time, for the purpose of providing a person with a chest X-ray that takes only a matter of seconds.

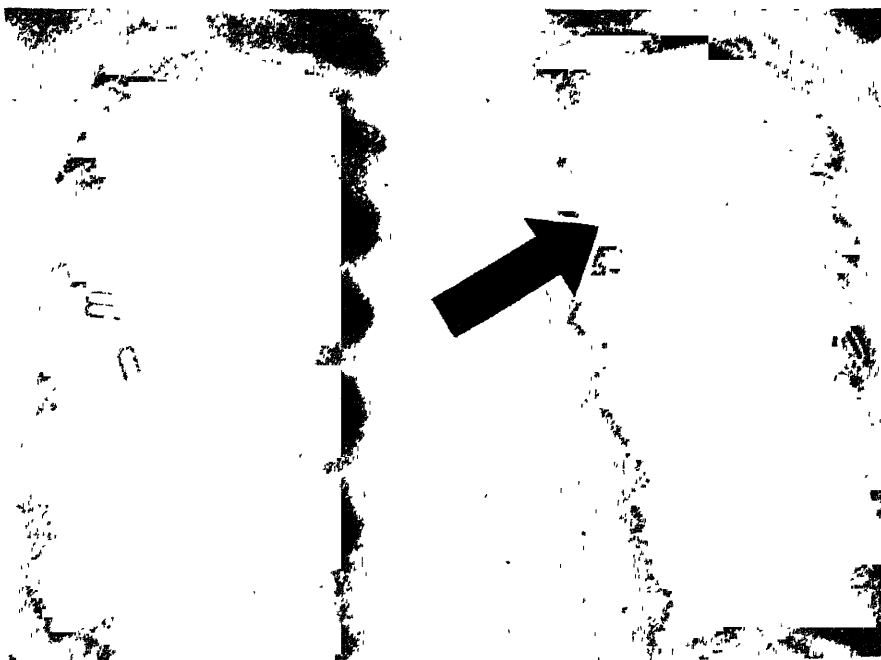
For the person to be X-rayed by this "case-finding" process the entire operation is as simple as the taking of a snapshot with an ordinary box camera. The person to be X-rayed steps in front of the X-ray unit where he is shown the proper stance and position by a trained technician and in less than two

seconds his X-ray has been "shot." These X-rays are then processed and interpreted by a physician.

Tubercle bacilli, germs which measure only 1/500 of an inch in length, are the cause of tuberculosis. In many cases of early tuberculosis the tubercle bacilli are not present in the sputum but the X-ray will show their "suspected" existence in the chest. Early diagnosis is especially important because the treatment of this disease consists in developing the forces of resistance and the sooner the doctor and the patient know of the presence of this germ the better able they are to fight the disease.

Aids During Treatment

After serving its important part in diagnosis, X-ray continues to be of major aid to the doctor as he treats the disease. Before X-ray was put to use, knowledge of what happened in the lungs during tuberculosis infection had to be based mostly on what could be seen in post-mortem examinations. The X-ray makes it easier for the physician to understand the disease in its early stages,



ADVANCED TB—The arrow is pointing to a shadow that shows advanced disease in the left lung. The right lung has no such cavity. It requires the trained eye of a physician to interpret properly the shadows and highlights of the X-ray picture.



SNAP SHOOTING—It takes only a fraction of a second to make a picture. A trained technician shows the proper stance.

watch its progression or regression, and adjust treatment accordingly.

Chest X-rays are being offered with the latest scientifically developed equipment by the U. S. Public Health Service, by various state and municipal health departments and by Christmas seal sale organizations. In addition, there are private services, such as Powers X-Ray Service of Glen Cove, L. I., which handle mass surveys for civic, educational, industrial, labor and other groups. A letter or phone call to your local Tuberculosis and Health Association, or Public Health Center, will bring information as to where these X-rays are available in your locality.

When the X-ray picture of the chest shows a shadow over the lung, the doctor will want to make further tests before a final diagnosis. If the X-ray was taken with small size film, a second X-ray with the large 14x17 diagnostic film will be taken. The small films are used for screening, that is to distinguish between those with no shadow on the lungs and those with shadows that might mean tuberculosis.

A shadow on the lungs might be due, for example, to cancer of the lungs. On

the large film the X-ray specialist, called a radiologist, can usually distinguish between these two diseases. Histoplasmosis, a fungus infection of the lungs, can also cause shadows in the X-ray picture.

After the large film has been studied, the doctor will make further tests to corroborate the diagnosis. Sputum, fluid washed out of the stomach and urine will be examined to see whether tuberculosis germs are present in any of these fluids. A blood sedimentation test will also be made. The rate at which the red blood cells settle when the blood stands in a tube will show a toxic condition, if such is present.

Once the doctor is convinced that the patient has tuberculosis, he will undoubtedly advise that the patient go to a sanatorium for a rest cure, as it is called. Treatment of tuberculosis, until the discovery of streptomycin, was based on rest. The patient stays in bed, cutting down bodily and mental activities and exertion to an absolute minimum.

This resting is best done in a sanatorium because few homes can provide the necessary quiet and freedom from

minor and major domestic incidents which worry a sick person. Protecting others from getting tuberculosis, when the patient is discharging germs in his sputum, is also more easily done in a sanatorium than in the patient's home.

The object of the rest is to give the body a chance to concentrate all its forces on fighting the tuberculosis germs. Even now that streptomycin's anti-TB germ action has been discovered, many doctors will still order absolute rest for the patient.

May Put Lung to Rest

Besides rest in bed for the body, doctors may advise procedure to put the infected lung at rest.

The commonest way of doing this is by pneumothorax. This consists in injecting air into the pleural cavity, that is, the space between the lungs and the chest wall. The injection is made painless by a small amount of local anesthetic.

Normally the lungs, contracting and expanding 25,000 times daily throughout life, fill the space between them and the chest wall. But when air is put into this space, the rather elastic lung collapses and remains in a collapsed resting position. Both lungs may be



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Do You Know?

The first *Epsom salt* came from a mineral spring at Epsom Downs, England.

A synthetic *drug*, called synhexyl, is successfully used to "cheer-up" patients in the fight against mental sickness

A broad 4,250-acre swampy plain near the Rhone river in France has been planted during the past dozen years with some 350,000 poplars.

A state *lobster hatchery* in Maine raises some 600,000 baby lobsters each year; they are distributed to more than a hundred coastal areas along the rocky shore of the state.

Cows, chickens, pigs and other *farm animals* do not like hot weather any more than people do; one evidence is that their production drops off.

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partially collapsed. Refills are necessary at intervals to replace the air which is absorbed.

In some cases of tuberculosis, the doctor may decide to cut the phrenic nerve so as to paralyze one side of the diaphragm. The diaphragm is then pushed up by the organs beneath it, and compresses the diseased lung.

The lung collapse from pneumothorax is temporary. If the doctor thinks the lung should be permanently collapsed the operation called thoracoplasty may be performed. This consists in removing the ribs so as to allow the

chest wall over the diseased area of the lung to fall in and collapse the lung permanently.

Streptomycin, penicillin's ally in the fight against germ diseases, is being used more and more in treatment of tuberculosis. This chemical from a mold in the earth has saved lives and shortened the course of the disease. It is not a cure-all. Its action is to check the tuberculosis germs, thus giving the body's natural defensive forces a chance to overcome the germs completely. Rest in bed and other forms of treatment may be needed along with streptomycin.

Science News Letter, September 13, 1947

ASTRONOMY

Stars Have Prominences

Observations on eclipsing binary star show that our sun is not only body with great flares of hot gas extending from it.

► STARS, as well as our sun, have great flaming prominences and flares of hot gas extending from them that make any earthly storms or volcanoes feeble by comparison.

This discovery was reported to the American Astronomical Society meeting in Evanston, Ill., by Dr. Otto Struve, president of the society and honorary director of Yerkes and McDonald Observatories.

Dr. Struve's observations were made on the unusual eclipsing binary star UX Monocerotis. His work throws new light upon the origin of gaseous streams, rings and shells which exist in many close double-star systems and in some peculiar single stars.

UX Monocerotis consists of a large, fairly massive star of the same type as the sun, although much larger, and a hotter star of less mass. These stars revolve around each other at speeds of 37 and 87 miles per second, respectively. There is a total eclipse when the solar-type star hides the smaller, hotter one. During this eclipse clouds of calcium gas are observed spectroscopically expanding outward from the solar-type star at a velocity of 155 miles per second.

But the hotter star also gives out prominence clouds, principally of observable hydrogen gas. The sun's own prominences, which are visible during a total eclipse of the sun as bright red tongues of "flame", are composed prin-

cipally of hydrogen, but also contain large amounts of the same calcium gas observed in the case of UX Monocerotis.

Frequently observed gaseous streams and rings in other eclipsing variable stars owe their origin to a similar process, Dr. Struve said, explaining it is probable that all of these tenuous formations are being replenished by prominences from one or both stars. He expects that prominence action is also responsible for the formation of rings in rapidly rotating single stars.

Dr. Struve suggested that the enormously extended atmospheres of supergiants, such as Deneb (alpha Cygni), may also be caused by a vast field of prominences. He credited Dr. Donald H. Menzel, of Harvard, with arriving at substantially the same conclusion by an entirely different process of reasoning.

Science News Letter, September 13, 1947

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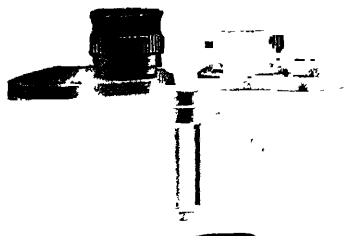
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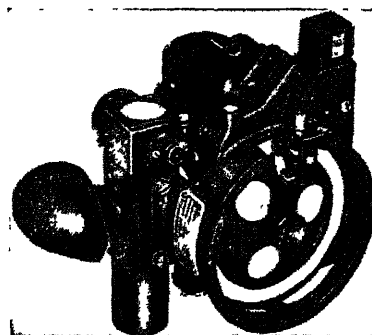
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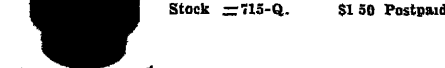
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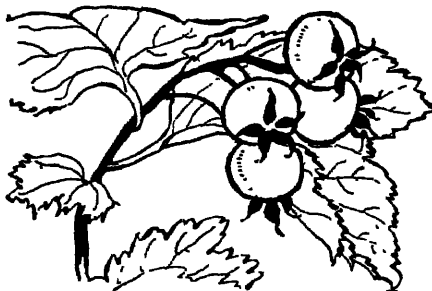
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➤ AUTUMN sees a steady, finally a rapid, diminution in the bright show of flowers that has delighted our eyes and noses ever since spring. The brightness has not all departed, however; it remains with us in the tawny gold of hawthorn and persimmon and false bittersweet, in the reds of coralberry and honeysuckle fruit, in the purples of wild grapes and woodbine berry and vibur-

num, in the gleaming white of the snowberry. Many of these persist after the last brilliant leaves have fallen from trees and shrubs, holding fast all winter, or until some hungry bird or squirrel nips them off.

That of course is the secret of their brightness. As the fair color and sweet scent of the flowers tempted bees, moths and other insects to sip nectar and thereby made possible the necessary function of pollination and fertilization, so the bright hues of the berries and fruits are invitations to animals, especially birds and mammals, to come and eat their fill and thereby disseminate and plant the seed. And that is what gives an advantage to those shrubs and trees that keep at least a part of their fruit until deep into the winter: their offerings may be passed up in the abundance of autumn, but will be taken gladly when glazed snow covers the ground and food is harder to find.

Most of the bright fruits, no matter how diverse their botanical kinships, are alike in having a more or less pulpy flesh surrounding one or more hard-coated, indigestible seeds. The pulp is the reward for swallowing; the tough seed is constructed for survival through the vicissitudes of digestion, emerging finally undamaged and ready for germination when warmth and moisture give leave. Indeed, it is quite probable that some seeds are even prepared for germination by the chemical action of their animal carriers' digestive juices on the resistant, impervious coats.

What the fruits may taste like to human tongues is no criterion of their acceptability to birds and other animals that may act as agents of distribution. Birds seem to have either no sense of taste or else a very strange one, for they will swallow without hesitation berries and small fruits that are bitter or nauseous to us, or at best insipid and tasteless. If there is a little sugar or starch in the pulp that is all the bird or beast cares about. Niceties of flavor are luxuries that man can afford, but they are not for the hungry beaks and teeth of the snowy woods.

Science News Letter, September 13, 1947

other uses, are now produced in a continuous-process machine into which the ingredients are dumped at one end and come out as finished products at the other.

The result is a saving of time over the old so-called batch method and a finer quality of grease is produced. In the generally used batch-process, the ingredients are heated in big kettles and mixed by paddles until they reach proper consistency. In the new process, which is suitable for greases other than those mentioned, mixing, heating and flow through the machine are all automatic. In it there is no handling of the grease during manufacture, and there is no chance for contamination.

The continuous-process method is a development of Shell Oil Company. It has just been put into production in the company's refinery at Martinez, Calif.

Science News Letter, September 13, 1947

CHEMISTRY

Chemistry Research Prize To Dr. George C. Supplee

➤ DOCTOR George C. Supplee, president of the G. C. Supplee Research Corporation, Bainbridge, N. Y., will receive the 1947 Borden Company prize for research in the chemistry of milk.

The award of \$1,000 and a gold medal will be presented to Dr. Supplee at the national meeting of the American Chemical Society this month.

Dr. Supplee, who was formerly associate director of research at the Borden Company, received the Billings Medal of the American Medical Association in 1936 for isolating pure vitamin B-2 from whey and from the wastes of milk sugar production.

Science News Letter, September 13, 1947

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COATING AND INK RESINS—A Technological Study—Dr. William Krumbhaar—*Reinhold*, 318 p., illus., \$7.00. Presents a clear understanding of the principles governing the formation, reactivity and the technical properties of coating and ink resins, based upon laboratory and factory experiments, and written for those who come into contact with resins in production, testing, or research.

EDUCATION IN ECUADOR—Cameron D. Ebaugh—U. S. Office of Education, Bulletin 1947, No. 2—*Govt. Printing*, 92 p., paper, 25c. Basic study on education in Ecuador which is one of a series prepared as a part of the program of cultural co-operation under the auspices of the U. S. Dept. of State.

HANDBOOK OF URANIUM MINERALS—Jack De Ment and H. C. Dake—*Mineralogist*, 80 p., illus., paper, \$1.50. For use of students, prospectors, collectors and non-specialists, an excellent work on uranium and thorium minerals, including world occurrences and methods for their detection and location.

THE HAVE-MORE PLAN—Ed and Carolyn Robinson—*Macmillan*, 326 p., illus., \$3.49. A practical tried plan for country living, including chapters on poultry, rabbits, goats, cows, sheep, bees, berries, fruit, vegetables, etc. A little land provides most of the food for a family of four as a part-time enterprise.

HEALTH FACTS FOR COLLEGE STUDENTS—Maude Lee Etheredge—*Saunders*, 5th ed.,

439 p., illus., \$2.50. An authoritative and interesting presentation of information in the field of individual and community health, including such important topics as communicable diseases and their control, new antibiotic treatments, nutrition and proper diet, mental health, allergy, and even first aid.

HOSPITAL CARE IN THE UNITED STATES—Commission on Hospital Care—*Commonwealth Fund*, 631 p., illus., \$4.50. A detailed reference book summarizing a two-year survey of general hospitals in the U.S. and analyzing all major hospital problems so that adequate preventive and curative health services for all people may be planned for a better tomorrow.

INDUSTRIAL CATALYSIS—B. B. Corson—11 p., illus., paper. Free from: *Mellon Institute*, University of Pittsburgh, Pittsburgh, Pa. Scientific advances in catalysis and part it plays in modern industry.

INVENTORS BEHIND THE INVENTOR—Roger Burlingame—*Harcourt*, 211 p., illus., \$2.75. Interesting facts regarding the inventive geniuses of America and their forgotten helpers. Research laboratories and the complications of the sciences today make individual heroes a thing of the past.

MANAGING YOUR MIND: You Can Change Human Nature—S. H. Kraines and E. S. Thetford—*Macmillan*, 374 p., \$2.75. A guide intended to aid in gaining insight into effects emotional states have upon determining bodily well-being.

SCIENCE AND PUBLIC POLICY: Vol. 1—A Program for the Nation—John R. Steelman—*Govt. Printing*, 73 p., illus., 20c. A comprehensive survey of U. S. position in field of science, together with broad outline of program for the next ten years to advance the position of this country in scientific research and development through establishment of a National Science Foundation.

SCIENCE IN PROGRESS—George A. Baitsell, ed.—*Yale Univ. Press*, 350 p., illus., \$5. The Fifth Series of this work, it contains ten essays by specialists in widely varied fields: seismology, physics, catalysis, respiration studies, blood immunity factor, genes, cancer, plant diseases, living cells in action, and anterior pituitary hormones.

SEMIMICRO QUALITATIVE ORGANIC ANALYSIS—Nicholas D. Cheronis and John B. Entrikin—*Crowell*, 498 p., illus., \$3.75. Utilizing the time and material saving new techniques, this text is designed for college students studying qualitative organic analysis, those taking first-year organic chemistry and industrial chemists and laboratory workers in related fields.

WASTE PICKLE LIQUOR—Richard D. Hoak—5 p., illus., paper. Free from: *Mellon Institute*, University of Pittsburgh, Pittsburgh 13, Pa. Important processes outlined for treatment of waste product in steel industry. Good bibliography.

WELDING ENCYCLOPEDIA—T. B. Jefferson, ed.—*Welding Engr.*, 12th ed. rev., 1024 p., illus., \$6.50. Very useful and handy

up-to-date compilation of principles, data, and most effective methods of welding in industrial and allied fields. Subjects alphabetically arranged and cross indexed so that they are readily found.

Science News Letter, September 13, 1947

BIOLOGY

Germ-Killer from Cinnamon Discovered by Accident

➤ A GERM-KILLER from cinnamon oil has been discovered. It was one of those lucky accidental discoveries, like that of penicillin itself. And it is a by-product of the huge scientific search during the war for chemicals to replace quinine as a malaria remedy.

The discovery was made by Sister M. Petronella Schroeder, C.P.P.S., bacteriologist at the Institutum Divi Thomae in Cincinnati.

Searching for a remedy related to penicillin in another mold, she used ether reclaimed after its war use in extracting a chemical from a plant that yields cinnamon oil. She got a germ-killer, but it was from the cinnamon oil, not the mold.

Science News Letter, September 13, 1947

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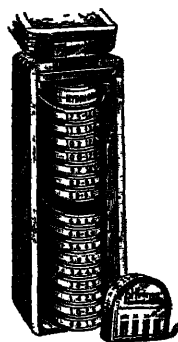
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Science News Letter, September 13, 1947

☼ **SOLID BRONZE** vise for attachment to a craftsman's bench holds work from .001 to 2.5 inches thick with equal ease and without marring. Three holes in each jaw behind the ordinary grasping surfaces permit the use of round rods to hold objects of irregular shape.

Science News Letter, September 13, 1947

☼ **CONSTRUCTION** panels, of the sandwich type in which a light material, sometimes in honeycomb formation, is resin-bonded between metal or other sheeting, have now been developed with aluminum foil for the honeycomb core. The metal-faced, metal-core panels have great strength and will float on water.

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☼ **VOLTAGE REGULATOR**, a portable instrument for alternating currents adaptable to a wide range of equipment, is suited for laboratory and other uses where good regulation at low cost is needed. It has an input voltage range of 95 to 125 volts AC with an output of 115 volts.

Science News Letter, September 13, 1947



☼ **LUGGAGE CANOPY**, made of heavy water-repellent olive-drab duck, fits into a luggage rack on the roof of an automobile to which it is fastened by elastic straps with swivel snaps. Its four laps, as shown in the picture, completely cover the luggage to protect it from rain, sun and dust.

Science News Letter, September 13, 1947

☼ **SILICA**, applied on front surface mirrors by low-temperature, low-pressure evaporation, does not increase reflection properties but gives the surface some 1,600 times better protection from abrasion. A special silica preparation prepared for this particular use is now available.

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☼ **FLEXIBLE SHAFT** machine, cabinet-enclosed and mounted on casters, can be easily moved about the shop to where its metal or wood grinding, polishing and other attachments may be needed. The flexible shaft provides rotary power to the tool as in the familiar grinder used by the dentist.

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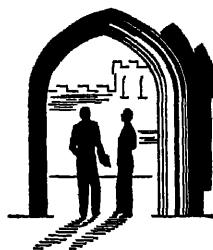


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PHYSIOLOGY

Women's Stomachs Differ

Girl with accidental hole in stomach shows scientists that emotion causes slowing of action with less acid. May be reason why women have fewer ulcers.

➤ **DISCOVERY** of a sex difference in stomach behavior was announced by Drs. Russell J. Crider and Shepard M. Walker of Washington University, St. Louis, at the American College of Surgeons meeting in New York.

When a woman is angry, resentful or frightened, her stomach turns pale, slows down and produces less acid and stomach juices. A man's stomach behaves exactly the opposite when he gets angry, resentful or worried.

This discovery may help explain why stomach ulcers afflict four times as many men as women. This difference between the sexes was discovered because an accident made a hole in a young woman's stomach which the doctors could look through from the outside. This is the first time medical men have been able to make such observations of the inside of a woman's stomach, although there have been four cases in which the inside of a man's stomach could be seen this way.

Most famous of these was the case of Alexis St. Martin whose stomach was left with a permanent opening from a bullet wound. An American Army surgeon, Beaumont, studied this man's stomach between 1822 and 1833.

The St. Louis doctors' patient was a 21-year-old Negro college student. The hole in her stomach had to be made to keep her alive. She had swallowed lye by mistake when she took the wrong bottle from the family medicine closet. The lye burned her esophagus, or gullet, so that she could not swallow.

The opening, on her left side, is about three by five inches. It is larger than those of the three men whose stomachs have been studied through such openings. The young woman, identified by the doctors as "Doris B.", has for the past two and a half years cooperated with the doctors in their studies. She has been enthusiastic at being able to help advance medical knowledge, though at times she has been disgusted, sullen and angry over what seemed to her procrastination and neglect in her treatment. It was when she was in such moods that the doctors discovered the

difference in her stomach's behavior from that of men in similar moods.

Most immediate direct benefit to other patients is the finding made with Doris' stomach that feeding beefsteaks by vein rests the stomach while nourishing the patient. This beefsteak-by-vein feeding consists in injecting solutions of either predigested protein or the pure amino acids that are protein building blocks. The method, developed shortly before the war, is being increasingly used for patients too weak or for some other reason not able to eat. Such feedings, Doris' stomach showed, not only do not stimulate the stomach but actually decrease its normal resting activity.

Science News Letter, September 20, 1947

AERONAUTICS

New Army Plane Its First Four-Jet-Engine Fighter

➤ **THE FIRST** U. S. Army four-engine jet-propelled fighter airplane is now ready for ground and taxi testing at

the plant of the Curtiss-Wright Corporation. It is the Curtiss XP-87.

The four jet engines of the plane were manufactured by Westinghouse Electric Corporation. The plane has a wingspan of 60 feet and an overall length of 65 feet. It will be operated by a two-man crew. It is designed for action under the most extreme weather conditions.

The Curtiss XP-87, with its bullet nose, has a low canopy over the pilot's compartment and an elevated tailpiece with horizontal fins. The engines are placed in pairs in housings built into the wings at a distance from the fuselage. Landing gear wheels are under the engine housings and under the nose of the plane itself. The crew in the compartment are well ahead of the wings and engine nacelles where an unobstructed view is available.

Science News Letter, September 20, 1947

CHEMISTRY

Nylon Squirted to Sheets And Made into Washers

➤ **NOW STRIPS** of nylon, the same plastic material that goes into stockings, are squirted out as sheets and punched out in the form of washers and gaskets.

Heat up to 500 degrees Fahrenheit is withstood by the extruded nylon, which is also tough and resilient to wear. The Polymer Corporation located in Reading, Pa., is the manufacturer.

Science News Letter, September 20, 1947



FOUR-JETTER—Army's newest fighter is operated by a two-man crew and designed to operate under most extreme weather conditions.

MEDICINE

New Attack on Cancer

Treatment with series of chemicals that block cancer's energy production system, also results in improvement of patients with other diseases.

➤ **IMPROVEMENT** in 28 of 58 cancer, Hodgkin's disease and acute leukemia patients has been obtained with a new and fundamental chemical attack on cancer reported by Dr. Maurice Black of New York at the International Cancer Congress.

This is the same Dr. Black who earlier in the meeting reported a simple blood test for cancer. (*See SNL, Sept. 13.*) The improvement unfortunately does not last more than a few months. But Dr. Black hopes that by continuing on his present line of attack he can find a way to outwit the cancer permanently.

One step toward this goal has been taken since he first reported his new method of treatment to cancer specialists last May.

The treatment consists in giving chemicals which block the cancer's mechanism for producing energy from food chemicals. This mechanism is different in cancer cells than in normal cells. The first two chemicals used to block this mechanism in the cancer are sodium

fluoride and iodoacetic acid. Within three weeks, the patient begins to get better. The cancer, or in Hodgkin's disease the enlarged glands, shrink but after two or three months, the patient relapses. This is because the cancer has found a new way to run its energy-producing mechanism. A third chemical, malonic acid, is then given. This stops the cancer, but only for a time. Then Dr. Black gives a fourth chemical, sodium azide. This may make the patient worse temporarily, because it lets the cancer go back to its original energy mechanism. But at that point, the sodium fluoride and iodoacetic acid can be started again and will again be effective for a few months.

A carrier chemical which will bind the cancer-stopping chemicals to the cancer cell and thus prevent the cancer from adapting to them is now sought. When and if this can be found, it may provide a way to chemical cures of cancer, acute leukemia and Hodgkin's disease.

Science News Letter, September 20, 1947

PHYSICS-PHYSIOLOGY

Use Radioactive Hormone

➤ **RADIOACTIVE** sex hormone has been made for the first time.

The conquest of cancer may be advanced by this achievement. Carbon fourteen, radioactive form of carbon produced in the atomic pile, was used to prepare synthetic male hormone. Details of the method are reported by Dr. Richard B. Turner of Harvard. (*Science, Sept. 12*)

The relation of sex hormones to cancer may be cleared up by use of such radioactive synthetic hormones. Scientists have long known that there is such a relation. Sex hormones are now being used in treatment of some forms of cancer with some success. These treatments might be made to succeed in more cases if doctors knew more exactly the relation between the hormones and cancer.

Preventing at least some forms of cancer is another possibility opened up

by development of a method to make sex hormones radioactive. Cancer, according to one theory, occurs in some cases because sex hormones and perhaps other hormones are changed in the body to cancer-causing chemicals. The change is a mistake in body chemistry. More about how and where in the body such a change takes place, if it does, might be learned by following the path of the hormone that has been tagged with radioactive material which can be traced.

Science News Letter, September 20, 1947

MEDICINE

Skin Cancers Improve With Beef and Lamb Extract

➤ **EXTRACTS** of beef spleen and lamb liver injected into the skin have cleared up skin cancers in 33 out of 48 cases, Dr. Joseph C. Amersbach of New York

Post-Graduate Medical School reported to the International Cancer Congress.

The extracts were developed by Dr. Leo C. Nutini of the Institutum Divi Thomae, Cincinnati.

All but two of the other 15 showed improvement but the treatments were not completed. There were five recurrences of the cancer, four of them in recently treated cases. Recurrences also sometimes occur, Dr. Amersbach said, when these simple skin cancers are treated with X-rays or by surgery. Two-thirds of the cases have been followed for from two to four years. Dr. Amersbach intends to follow them to see whether they will remain healed for the five years accepted as criterion of success in treating cancer.

Science News Letter, September 20, 1947

SCIENCE NEWS LETTER

Vol. 52 SEPTEMBER 20, 1947 No. 12

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5 00 a year, two years, \$8 00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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PHYSICS

Lighter Elements Fissioned

Now fission has been caused in nuclei as light as tantalum, element 73, by ultra-high energy atomic bullets from giant cyclotron.

➤ FISSION, originally confined to the heaviest elements such as uranium and plutonium, has been caused in atomic nuclei as light as tantalum, element 73, by ultra-high energy atomic bullets fired by the giant University of California cyclotron.

Splitting of nuclei in the fission reaction was achieved with platinum, lead, bismuth, and thallium, as well as with tantalum, a group of Berkeley scientists report. (*Physical Review*, Aug. 15.)

The scientists add that elements between tantalum and bismuth, the heaviest of the five, probably could be "fissioned," but that no efforts have been made to do so yet. These intermediate elements include mercury, gold, iridium, osmium, rhenium, and tungsten.

The group of scientists reporting the research include Dr. Isadore Perlman, R. H. Goeckermann, Dr. D. H. Templeton, and Dr. J. J. Howland. The research was sponsored by the Atomic Energy Commission.

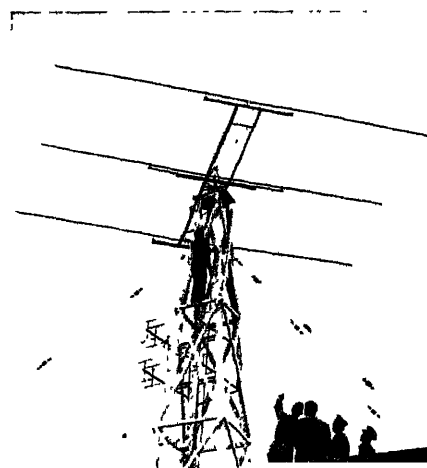
Dr. Perlman stated that ultra-high en-

ergy fission with deuterons, neutrons and alpha particles differs from the slow neutron fission which causes an atomic bomb to explode. There is no chain reaction, he explained, therefore the high energy fission reaction in these elements is not applicable to making a bomb or to atomic energy.

The scientist added that such research is invaluable in yielding new fundamental information about the atomic nucleus.

In addition to the absence of a chain reaction in high energy fission, this type of fission differs from slow neutron fission in other ways. Some stable, non-radioactive isotopes are found as primary fission products. Nuclei fissioned by high energy particles tend to split more evenly, where slow neutron fission produces a less even split. Some products not found in slow neutron fission are produced in the heavier elements. There is a decreasing incidence of fission in lighter elements with high energy particles.

Science News Letter, September 20, 1947



FOLLOWS PLANE—This rotating antenna always points in the direction of a plane in flight, helping to maintain constant contact between the pilot and the AAF in Washington.

reau of Standards use standard counting apparatus with the diamond placed between two small brass electrodes. One electrode puts 1,000 volts of electricity across the diamond, while the other connects with the counting apparatus.

Rays from radioactive materials are counted by setting up an electrical pulse when they strike the counter. When a ray strikes a diamond, it knocks an electron off one of the atoms in the diamond molecule to set off the electrical pulse.

The structure of diamonds includes a large percentage of empty space for the pulse to be set up in. Though they are one of the hardest substances known, diamonds actually contain only .0000-00000000001% of matter, or atoms. Another advantage is that diamonds are crystals which have the atoms arranged in a regular pattern with paths for the electrons to follow.

Science News Letter, September 20, 1947

PHYSICS

Diamonds Count Radiation

Because of small size they can be used inside human body to detect rays from radioactive materials. Must be perfect gems.

➤ DIAMONDS can be used to detect, and "count" the radiations of uranium and other radioactive materials.

This discovery, disclosed at the National Bureau of Standards, may give atomic scientists a new tool and offer a new type of alarm instrument to protect the lives of atomic workers from potentially deadly rays.

Bureau of Standards scientists said tests have shown that diamonds, size-for-size, are a thousand times more sensitive detectors of alpha, beta and gamma rays than any man-made counter. The Geiger-Mueller counter, frequently used to reveal atomic radiation, is considered one of the most sensitive of scientific instruments.

Diamonds used as counters in the same manner as the Geiger-Mueller counter have two big advantages over standard radiation counting instruments. Diamond counters could be used for a long time, compared with the three months to two years of use for standard equipment, and the diamond counters can be far smaller. Small size will permit diamond counters to be used inside the human body or in small openings in industrial equipment, scientists at the Bureau of Standards explained.

To detect and measure the radiation from radioactive materials, the diamonds must be colorless and "perfect." Only one diamond in 40 is estimated to qualify.

Diamond counters tested at the Bu-

GEOPHYSICS

FM Radio Waves Used in Prospecting

➤ FM RADIO waves are used in geophysical prospecting for such things as oil domes, ore bodies and rock strata fit for bridge and dam foundations, in the invention on which patent 2,426,918 has been awarded William M. Barret of

Shreveport, La., assignor to the Engineering Research Corporation of the same city. Mr. Barret declares he has discovered that earth layers do not quench electromagnetic waves of radio frequency as rapidly as has been assumed, so that he can project these

into the ground and receive their echoes at suitable distances. Radio signals projected directly to the receiving station travel at the known rate for such waves in the atmosphere and thus serve to time the exploratory waves.

Science News Letter, September 20, 1947

MEDICINE

Lack of Training a Danger

Patients of the next generation may suffer because thousands of young doctors returning from war cannot get the surgical training they need.

➤ FROM such triumphs as the blue baby operation, American surgery may descend in the next generation to a new low level of unnecessary and poorly done operations. If it does, hospitals unprepared to meet the challenge of the immediate postwar situation will be to blame.

This grim picture of the future of surgery was presented by Dr. Harold L. Foss of Danville, Pa., before the American College of Surgeons in New York.

At the same time, TB patients and their doctors were being assured that they run less risk from the operation of having a lung removed than they do from tuberculosis itself. Good results after a lung removal are of long standing, and good health can be restored by the operation, Dr. Richard H. Overholt of Brookline, Mass., declared.

The operation is advised, he said, for patients who have had all other forms of treatment without benefit and those who have associated diseases or a type of tuberculosis in which other forms of treatment are known to fail.

Danger for surgical patients in the next generation comes from the fact that thousands of young doctors returned from war have not been able to get further training in surgery in hospitals. At the Geisinger Memorial Hospital where Dr. Foss is surgeon-in-chief, 14 residents were appointed for surgical training this year. But, he reported, 410 men applied for these positions.

"Thousands of men failing to secure training they desire and for which they are willing to make every sacrifice are going into practice discouraged, often cynical and completely untrained.

"The inadequacy of their training," he predicted, "will be reflected in the generation upon which we now enter."

Smartly styled, well pressed uniforms for orderlies and other non-professional

workers in hospitals would be a good step toward solving one of the most pressing problems of all hospitals today, the labor problem. This is the advice of Brig. Gen. Robert Wood Johnson, chairman of the board of Johnson and Johnson, to the College of Surgeons.

Such a step would not be trivial, he pointed out, because it would do much to give hospital help a feeling of self-respect which is a big factor in the performance of any worker. It would help also by inspiring a greater respect by nurses and internes and staff doctors for the non-professional worker.

"It must be difficult," Gen. Johnson observed, "for the primly starched nurse to respect fellow employees who look as if they had tumbled directly from a wet wash bundle."

On the fundamental problem of hospital income, Gen. Johnson advised hospitals to contact local labor leaders. The hospital should work out with them plans for serving organized wage earners and so receiving their support.

The days of large and continuous contributions from wealthy people are over, Gen. Johnson believes. Public income from taxes may increase but is not likely to meet every need of our 6,700 hospitals with their 1,700,000 beds. But wage earners, the people who produce and receive the bulk of the national income, also form the great majority of hospital patients. Through their labor organizations they may be able to help finance hospitals.

Science News Letter, September 20, 1947

RADIO

International Television Is Predicted Soon

➤ TELEVISION of the relatively near future will permit us to look around the earth, from city to city and nation

to nation, as easily as we now listen to global broadcasts, Brig. Gen. David Sarnoff, president of Radio Corporation of America, told the American National Commission of the United Nations Educational, Scientific and Cultural Organization meeting in Chicago.

This is no idle dream, he said, and no one need doubt that we shall have international television. It is nearer than most people may realize. Already the scientific principles and means for worldwide television are known. No technical problem is involved that money cannot solve.

The system predicted would permit Americans to see events as they occur in foreign nations, and their citizens to see happenings in other nations in the same continent or in other continents. It would give a picture of life more vivid than can be conveyed by the press or the radio.

Another development to be revealed soon, Gen. Sarnoff designated as "ultrafax" or a radio mail service. It is a combination of radio and television. The system will transmit letters, printed pages, maps and pictures, delivering them to their destination as error-free facsimiles of the original.

Details of this RCA ultrafax system will be revealed in a month, he said. It is capable of transmitting the equivalent of 40 tons of airmail, coast to coast, in a single day; a 500-page book in half a minute, and a Sunday newspaper, including the comics, in one minute.

Science News Letter, September 20, 1947

PLANT PHYSIOLOGY

Plants "Needled" for Microchemical Tests

➤ STALKS, stems and other parts of plants can be very accurately "needled" to test the effects of 2,4-D and other chemicals, through a new technique developed by Miss Irma M. Felber of Michigan State College. (*Science*, Sept. 12.)

Where the plant part to be tested stands at such an angle that it will not support a drop of liquid, Miss Felber pierces it with a needle made of fine florist's wire, which has been threaded with ordinary white mending cotton soaked in a solution of the chemical. Then she snips off the thread close, on both ends. Or, if a continuing supply of the chemical is wanted, she dips one end of the thread in a vial of the solution and lets it serve as a wick.

Science News Letter, September 20, 1947

MEDICINE

Stop Excessive Bleeding

Protamine used to control the action of heparin which saves patients from death by blood clots. Lung operations also cure.

➤ A WAY to save patients from bleeding to death after escaping death from blood clots in brain or heart was announced by Drs. Conrad R. Lam and Leonard L. Cowley of Detroit at the meeting of the American College of Surgeons in New York.

Fatal blood clots that come sometimes after operations and childbirth, and even oftener in medical patients, may be prevented by using a chemical, heparin, which makes the blood more fluid. When patients are given heparin, the time it takes their blood to clot may be prolonged from a normal 19 minutes to two hours.

But when it takes as long as two hours for the blood to clot, the patient may bleed to death from a cut or from the operation wound or after childbirth. So doctors have hesitated to use heparin.

This danger of fatal bleeding can be overcome by protamine, the fish-protein chemical used to prolong the action of insulin in diabetes. A dose of protamine injected into the veins will bring a very slow clotting time back to normal in five minutes, the Detroit doctors reported. They consider it an effective weapon to combat emergencies when a patient is being given heparin.

Penicillin Brings Complication

Penicillin, famous mold chemical that has saved thousands of lives from pneumonia, has brought a new complication in its wake. This is collapse of the middle lobe of the right lung.

Remedy for the condition is an operation to remove the collapsed lobe, Dr. Evarts A. Graham, professor of surgery at Washington University, St. Louis, told members of the American College of Surgeons.

Patients with this condition are coming to doctors in large numbers. Penicillin should not be blamed, Dr. Graham emphasized. Without the mold chemical, the patients would be dead because the pneumonia they suffered was so severe. But although they have not died, they have never fully recovered. They have attacks of fever, they are bothered by

coughing and they have not regained the weight lost during the pneumonia.

The operation restores them immediately to health. The day afterwards, they feel well. They leave the hospital in eight or ten days, perfectly well, and go back to work in a month.

They develop the lung collapse, technically known as atelectasis, partly because of the peculiar anatomy of the right lung. This lung, unlike the left, has three lobes instead of two. On either side of the bronchial tube leading to its middle lobe are lymph glands draining the lower and middle lobes. In severe pneumonia, which killed the patients before penicillin, these glands become very swollen. As a result they squeeze together the bronchial tube leading to the middle lobe. Collapse and its unpleasant symptoms follow.

The condition can be detected by X-ray pictures. It usually affects middle-aged patients after pneumonia. It seems to be replacing as a complication of pneumonia, the empyema, or lung abscess, that was once so common in children and young people following pneumonia, but now practically banished by penicillin.

A lung operation that cures patients of a disease which, though not fatal, can make social outcasts of its victims, was reported by Dr. Alton Ochsner of Tulane University, New Orleans.

The disease, which is more common than tuberculosis, is known as bronchiectasis. It consists of a dilation of the bronchial tubes. Infections ranging from pneumonia to influenza and whooping cough are the primary causes. The patients are afflicted with a chronic cough which brings up foul-smelling sputum. The frequent cough and the smelly sputum may make their friends avoid them.

The operation consists in removing the affected part of the lung. It is advised for the one out of ten bronchiectasis patients who have a severe form of the disease, and particularly for young people.

Because a surgeon went in for weight-lifting in his college athletic program,

patients crippled by infantile paralysis and other conditions are getting back the use of partly paralyzed, shrivelled and useless muscles.

The surgeon who uses weight-lifting as treatment is Dr. Thomas L. DeLorme, Jr., of Boston.

The secret of his treatment's success is that it consists in power-building exercises, instead of endurance-building ones.

Professional strong men have known and used the principle for centuries. To build power, you lift the heaviest weight you can raise and repeat this only a few times. Exercises with lighter weights repeated many times, the customary type, build endurance but not power.

Working with chronic infantile paralysis patients, Dr. DeLorme finds strong evidence, though final evaluations cannot yet be made, that the method gives increase in size and power of muscles after many years of paralysis. The method is now being tried on patients with rheumatoid arthritis. It has already proved its value in patients with weakened, painful and useless muscles following war and other injuries.

Science News Letter, September 20, 1947

Rabbits will let garden plants alone if the growing vegetables are sprayed with sulfur dust, powdered lime or ordinary pepper.



ONLY FOR PEACE—Model of an atomic pile, the first to be built exclusively for peacetime research. Inspecting the model are Dr. Lyle Borst, atomic pile expert, and Wells N. Thompson, of the H. K. Ferguson Company, in charge of the construction. It is being built for the Brookhaven National Laboratory.

MEDICINE

Television and Movies Aid Training of Doctors

See Front Cover

◀ WILL television compete with moving pictures as a means of teaching future doctors? The possibility appeared as a result of demonstrations of both methods at the meeting in New York of the American College of Surgeons.

Operations to remove stomach, gall-bladder, and thyroid gland and to repair a hernia were televised from the operating room at New York Hospital to a suite in a hotel more than 20 blocks away. Surgeons in the hotel suite could see details of the operation as clearly as if they had been standing next to the operating table.

Since only a few surgeons can get that good a view of an operation, television promises greatly to extend the teaching value of the hospital clinic.

Moving pictures, combining animation such as that used in animated cartoons with shots of the actual operation, are another valuable teaching aid for medical students. One such picture was shown and enthusiastically received.

Besides the question of which has greater educational value, the relative costs and such technical problems as securing a special television beam that cannot be picked up by other receiving antennas may help to settle the question.

Science News Letter, September 20, 1947

PSYCHOLOGY

Brightest Boy Scientists Are Bigger and Healthier

➤ AMERICA'S brightest boy scientists are taller, heavier and healthier than U. S. soldiers of the same group. This was found in a study made by three psychologists and reported to the American Psychological Association.

The more brilliant of the youthful scientists are younger and more ambitious, but they are likely to have poorer vision, the study revealed.

Conclusions are based on a review of questionnaires sent every year to all contestants in the First Annual Science Talent Search for the Westinghouse Science Scholarships held in 1942. The study was made of about 2,000 superior boys now in their early twenties. They placed in the competition among the 40 winners, 260 honorable mentions or participated without placing.

Dr. Harold A. Edgerton, Ohio State

University; Dr. Steuart H. Britt, McCann-Erickson, Inc., New York City, and Dr. Ralph D. Norman, Princeton University, who conducted the study, found that their conclusions agree with previous studies made of persons gifted in intelligence. The more brilliant are generally more superior in other respects.

The three scientists added a new discovery. They found there is a direct relationship between high intelligence and returning questionnaires. The more brilliant were more faithful about sending back answers to the questions. The psychologists think this is due to well implanted habits of promptness or to pride in accomplishment.

Drs. Edgerton and Britt are the designers of the Science Aptitude Examination for the annual Science Talent Search. Examinations for the Seventh Annual Science Talent Search will be issued in November to seniors in private, parochial and public schools. The Science Talent Search is sponsored by Science Clubs of America, administered by Science Service, and supported by the Westinghouse Educational Foundation.

Science News Letter, September 20, 1947

ORDNANCE

V-2 Firing from Navy Ship Possibly Narrow Escape

➤ THE NAVY'S giant aircraft carrier Midway may have had a narrow escape when the first V-2 rocket was fired from a ship.

Army rocket experts, who have been firing the V-2's for more than a year over the desert at White Sands, N. Mex., said that reports to them indicated the first shipboard firing of the German weapon was no routine shoot.

The rocket was spitting fire from the wrong places when it was launched. It traveled an estimated six miles and exploded. Best guess is that the historic missile developed a fuel line leak, but the exact cause of the explosion can never be known certainly.

"We had a V-2 explode like that at White Sands last year when the Secretary of War was watching," an Army Ordnance spokesman commented.

He explained that the rocket vibrates as the thrust builds up during launching. This can shake loose parts in the rocket such as the fuel line.

Equipment for the firing from the Midway was loaned by the Army and will probably be returned to White Sands. The Army, however, has another set of launching equipment.

Science News Letter, September 20, 1947

IN SCIENCE

PHYSICS

"Silent Sound" Tested For Washing Clothes

➤ HIGH FREQUENCY sound waves may clean your clothes in the washing machine of the future.

The ultrasonic waves cannot be heard by human ears, but they can launder clothes. A demonstration in the ultrasonic laboratories at Pennsylvania State College recently demonstrated how these vibrations can provide the mechanical force of a standard washing machine.

In the demonstration, a dirty cloth in a bucket of soapy water was given an ultrasonic wave treatment. Areas of the cloth which had been exposed to the waves came out clean.

Work on ultrasonic laundering has been started under the direction of Dr. Pauline Beery Mack, director of the Ellen H. Richards Institute, and Dr. Harold K. Schilling, director of the acoustics laboratory.

Research on ultrasonic waves for washing clothes is also being carried on in Great Britain. One theory is that dirt is held to clothes by electrical attraction, and that sound waves will help shake the dirt loose.

Science News Letter, September 20, 1947

ICHTHYOLOGY

Fish Examined by X-Ray Without Dissection

➤ X-RAYS are useful in making internal examinations of fish specimens that may be too valuable to dissect. W. A. Gosline of the University of Michigan told the meeting of the American Society of Ichthyologists and Herpetologists at Higgins Lake, Mich. The technique is especially well adapted for the study of the skeleton, which in many groups is important in identification.

At the same meeting, R. E. Johnson and L. E. Hiner told of the usefulness of a new collecting instrument, the electric shocker, in studying the population of fishing streams and pools. The device brings out of hiding even the rarest and shyest of fish, which have hitherto been overlooked in making such census counts.

Science News Letter, September 20, 1947

THE FIELDS

PSYCHOLOGY

Birds May "Tell" Us How We Learn to Talk

➤ PARROTS and other talking birds may be the guinea pigs in experiments designed to find out how humans learn to talk if the suggestion of Dr. O. H. Mowrer, Harvard University psychologist, is carried out.

Scientists have already collected a large amount of information about the learning of rats, cats, dogs, apes and other animals. And they know a lot about how human children learn. But knowledge in these two fields is not yet well coordinated, Dr. Mowrer told the American Psychological Association.

In the whole animal kingdom, only talking birds offer an opportunity to study anything that is comparable to the learning of language in humans. But so far this opportunity has not been exploited, Dr. Mowrer explained. He plans systematic experiments that will show whether the birds learn to talk through some special "instinct of imitation" or by some other psychological mechanism.

Science News Letter, September 20, 1947

PHYSIOLOGY

Wrap Your Brain in Plastic; —It Won't Notice Difference

➤ WRAP up your brain in a sheet of plastic polyethylene; it won't know the difference between that and its natural covering, the dura mater. This discovery, of great potential importance in brain surgery, is announced by three Boston surgeons, Drs. Franc D. Ingraham, Eben Alexander, Jr., and Donald D. Matson. (*Journal, American Medical Association*, Sept. 13.)

Polyethylene, also known as polythene, is not a brand-new plastic. It has been made in England since 1936, and in this country since 1943. It is a translucent rather than a transparent plastic, flexible without being limp, but not very elastic. It can be formed into thin, tough sheets and drawn into tubing. It is thus probably usable for other purposes within the body than as a covering for the brain after surgery.

Thus far, it has been used only experimentally, on cats. It proved a per-

fectly good "ersatz" for the dura mater, or outer covering, of the feline brain.

Postmortem examination, both gross and microscopic, produced no evidence of irritation or injury to the brain tissue.

One thing has to be watched, however, the three surgeons warn. The polyethylene must be obtained in chemically pure form, not with the antioxidant chemical that is sometimes added to improve its performance in non-surgical uses. This added chemical, unlike the polyethylene itself, does irritate living tissues.

Science News Letter, September 20, 1947

PLANT PHYSIOLOGY

Uranium Solution Boosts Yield from Treated Seed

➤ RADIO-AGRICULTURE may be one of the developments of the atomic age that is now dawning. Hints of what may be coming are given in a report to the French Academy of Sciences by a nephew of Henri Becquerel, first man to observe radioactivity, the botanist Paul Becquerel. He states that treatment of seeds with solutions of salts of the radioactive elements greatly increases their yield as compared with control plants from untreated seeds.

Working with Mlle. Jacqueline Rousseau, M. Becquerel dipped peas in a one-to-10,000 solution of uranium nitrate. Vines grown from these out-yielded the controls by 10% on a dry-weight basis. When a growth-promoting hormone, phenylacetic acid, was added to the solution, the increased yield amounted to 27.5%. Similar treatment with a solution of manganese sulfate brought about a 19% dry-weight increase in yield.

Science News Letter, September 20, 1947

ZOOLOGY

Don't Use Bats To Drive Out Bats

➤ WHEN bats fly into your house or apartment, do you go after them with a baseball bat, a tennis racket or a fish net? Any of these is the wrong answer, according to animal experts at the Philadelphia Zoo.

Zoo personnel have been answering many phone calls from bat-invaded homes. The zoo's advice: open doors and windows and turn off the lights; the bats will fly out of their own accord.

Bats generally do no harm, but they will bite if you pick them up.

Science News Letter, September 20, 1947

SURGERY

Grasping Ability Restored After Loss of Fingers

➤ A MAN can lose all the fingers and thumb of his hand and still be able to dress, feed himself, and use pencils, hammers and other tools, thanks to an operation reported to the American College of Surgeons by Drs. Bradford Cannon of Boston, Walter C. Graham of Santa Barbara, Calif., and James Barrett Brown of St. Louis.

The operation restores the grasping ability which is one of the most important differences between man and other animals.

In the operation, the bone between the base of the thumb and the wrist is fused to the bone between wrist and base of the forefinger. A cleft is then made between the stump of the forefinger and the stump of the next finger, going down toward the wrist. This gives a thumb which can be brought over against the rest of the hand and used for picking up and grasping things as the normal thumb is used.

Science News Letter, September 20, 1947

MEDICINE

A-Bomb Expert Heads Lab To Study Radiation Injury

➤ STUDIES of means of treating radiological injury to man will be undertaken by a new atomic radiation medical laboratory which will begin operations in October at the University of California at Los Angeles.

Dean Stafford L. Warren, of the Medical School on the Los Angeles campus, will direct the laboratory which will function under a contract with the Atomic Energy Commission.

Medical data collected after the atomic bombings of Hiroshima and Nagasaki and in the tests at Bikini will form the starting point of the project.

Dr. Warren has been closely associated with medical aspects of the atomic bomb since 1943, when he was appointed medical director of the Manhattan project. Later he was in charge of radiological survey parties studying the Japanese cities. He also headed the medical staff at Bikini last year.

Dr. Warren will begin operations with a staff of from 30 to 40 people, and the research will be closely coordinated with similar work being done on the Berkeley campus of the University.

Science News Letter, September 20, 1947

ENGINEERING

Heat from Cold Earth

Refrigeration in reverse uses the heat taken a little at a time from below frost level to warm winter-chilled homes. Same system cools house in summer.

By A. C. MONAHAN

➤ THERE is always enough heat in the cold earth below frost level to make a home comfortable. It has to be gathered in small amounts from the outside and built up within the house to the temperature desired.

Scientists have the know-how. Engineers have developed producing methods. Manufacturers are now turning out house-heating units that use the heat in the outside cold air, of water in deep wells, or the year-round uniform heat of the cold earth buried deep enough so that it never freezes.

Many successful applications over past years prove the scheme practical. The principle used is often referred to as refrigeration in reverse. One advantage is that the system can be used both for heating and for cooling. Mechanical power, usually electrical, is required, but there is no fuel burned in the house.

Electricity can be used for direct heating as in the well-known electric-heaters, but this refrigeration-in-reverse system is much more economical. The electric energy used this way provides from three to five times as much heat.

The science behind the methods of using the heat in outside atmosphere, water or earth in house-warming is not difficult to understand. Those who know how the ordinary household electric refrigerator works already understand. It is based on the heat-absorption that takes place when a liquid is changed into a vapor, and the heat-emission when a vapor is condensed again into a liquid.

Condensation Makes Heat

When vapor, or a gas, is converted into a liquid it gives off heat. Some gases can be liquefied rather easily by lowering their temperatures. All gases can be liquefied by compression, some readily and others with much more difficulty.

When a gas is compressed, its temperature is raised even before it becomes converted into a liquid. This accounts in part for the heat within an automobile tire filled with air under compression, which is increased by the compression of rolling.

The action in the household refrigerator, cooling systems in theaters, and in the house-heating by refrigeration scheme, all depend upon alternately changing a liquid to a gas, then back to a liquid again, in a continuing process.

Electric refrigerators give off heat. This is why they operate best in an ordinary room, and not in a closet. They should be set a little away from the wall to permit air circulation behind them. This permits the air to remove the heat, which usually is discharged through the rear.

In the circulatory system in the home refrigerator the refrigerant, the liquid-to-gas-to-liquid again fluid, passes around in a single circuit. In the house-heating system, there may be only one circuit or there may be two. The fluid that picks up the outside heat in the water or the earth may be in a closed circuit, delivering its heat through a heat exchange unit within the house.

In either case, the outside section is

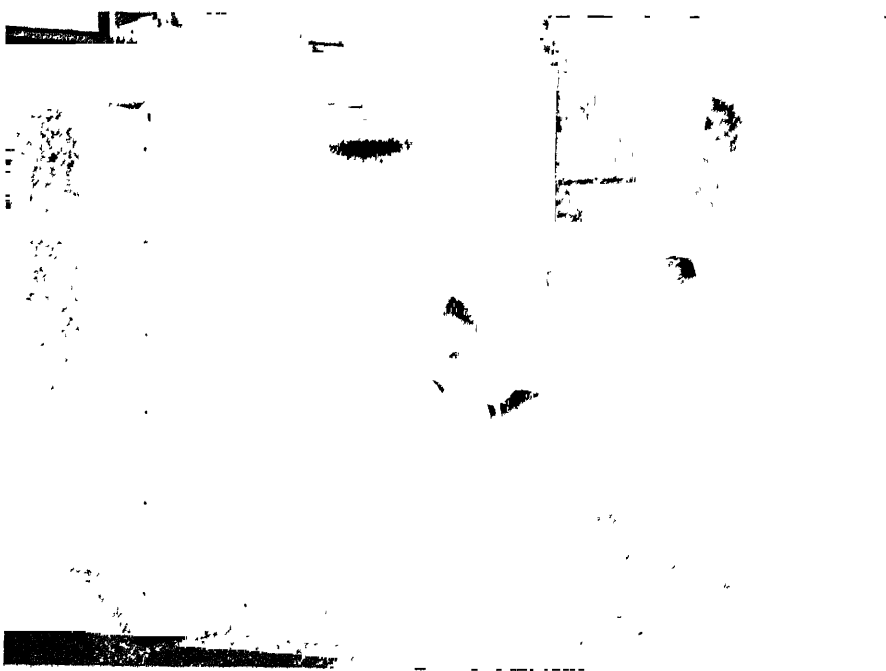
buried deep under the ground or projects downward into the water in a deep well. It might seem that the cold earth just below frost level, or the cold water in the bottom of a well, contains no heat. But it does. Everything contains some heat unless its temperature is at what scientists call absolute zero. This is approximately 460 degrees below zero on the Fahrenheit thermometer.

A liquid circulating through a pipe in the earth will pick up some heat, even from the cold dirt, if its temperature is lower than that of the soil. When the little heat gathered on each trip through the earth or water is taken out within the house, it gradually raises the home temperature to a comfortable status.

The Heat Pump

The gadget that does the trick is what is called a heat pump. Compression pump might be a better name. In addition to compressing the gas into a liquid, there must be means to keep the refrigerant in circulation. These are what use the electricity.

A good circulating refrigerant is one that can be easily changed from liquid to gas, or from gas to liquid. Water, however, can be used as a pick-up fluid.



ENCLOSED—This is the Marvair system for heating by refrigeration in reverse.



TYPICAL INSTALLATION—This is a side view of the Terra Temp equipment for getting your heat from mother earth below frost line.

Freon is also used. It is the refrigerant widely used in theater-cooling. It starts into the earth or well water in a liquid form. It picks up enough heat from the earth or water to turn it into a vapor. The gas, within the machine in the house, is compressed, greatly raising its temperature. Then it passes into a condenser where the heated gas is converted into a liquid, giving up its heat to the house.

For summer cooling, the system works in reverse. The heat within the house is picked up by the air-circulating ducts and carried to the soil or water, both of which even in the hottest weather are cooler than the surface air.

There are several types of heating or cooling systems now being manufactured in the United States. One is unique in that it takes its heat from outside cool air. It is a complete unit in an attractive cabinet designed for use in a single room. It is a product of Drayer-Hansen, Inc., Los Angeles, with the trade name of Airtopia.

Air-to-Air

This unit is what might be called an air-to-air device. In heating, it draws in air from outside. This passes over refrigerated coils and gives up its heat. It is then expelled to the outside at a lower temperature than it had when it entered.

The heat taken from the outside air is transferred to other coils within the unit.

There it is picked up by room or fresh air circulated in the air-conditioning stream. It is intended for use in relatively mild climates, and has very special advantages. It can heat a room in early morning, and later in the day cool the room during the afternoon's hot sunshine.

Earth-to-Air

The Marvair system, built by the Muncie Gear Works, Inc., Muncie, Ind., is what might be called a water-to-air or an earth-to-air heating method. It has three separate circuits. The first is an underground pipe through which water passes to absorb heat from the earth or from well water. The second is the refrigerator circuit which transfers heat to the air stream and to a higher temperature level. The third circuit is that of the air stream which carries heat to or from the space to be conditioned.

The water circuit is a closed system through which the water is driven by a centrifugal pump. Included in the circuit is a vertical U-shaped tube that projects downward at least 200 feet into the water in a well. One-inch pipe is normally used.

The Marvair system is suitable for homes, offices or small commercial buildings. The unit can be installed in a basement, utility room, or even in a closet.

A third system is of interest because it

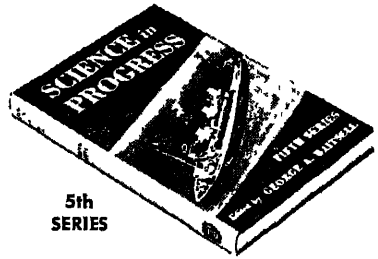
uses earth heat only, and employs circulating freon as a refrigerant. It is called Terra Temp, and is made by the Terra-Temp Company of Indianapolis. It gets its heat directly from the earth, and dissipates heat into the earth when in use for home-cooling. It can be used in any climate where the outside pipes can be laid three or four feet under the earth's frost level. The climate, however, will determine the size of the unit needed.

This Terra Temp system is more exactly like ordinary electric refrigerators than the others described. In this, the refrigerant, in a cold expanded state, passes through the underground circuit and picks up heat from the ground. The refrigerant is vaporized by the heat absorbed.

The vapor enters a compressor where it is boosted to a higher temperature. The hot vapor then passes over coils where its heat is picked up by an air stream which circulates through the house. The loss of heat from the vapor condenses it to a liquid again, and it continues on its circuit. Automatic thermostatic control will reverse the cycle when needed and the system becomes a cooling instead of a heating unit.

Science News Letter, September 20, 1947

YALE



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SERIES

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Edited by
GEORGE A. BAITSELL

The fifth series of SCIENCE IN PROGRESS contains reports on recent major investigations by ten outstanding scientists in the fields of seismology, physics, chemistry, biochemistry, anatomy, cancer, genetics, biology, and plant physiology and pathology. There is a Preface by the Editor and an Introduction by Frank B. Jewett, President of the National Academy of Sciences, on the effect of the war upon fundamental and applied science and scientific manpower.

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Do You Know?

Chile is planning to produce *copper salts*, having a plentiful supply of the necessary raw material.

Some of the most spectacular of the weird and brilliantly colored formations known as *badlands* are in the Theodore Roosevelt National Memorial park in North Dakota.

Soft field corn can be safely stored and used as *cattle feed* if subjected to artificial drying.

Bulls are generally thought to be the most dangerous *farm animals* but horses account for most livestock accidents.

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AGRICULTURE

Corn Driers To Save Crop

Picked before it is fully mature, corn contains too much moisture to store safely in cribs. Conference shows drying machinery can be produced.

➤ **CORN ISN'T** going to be lost through spoilage in the cribs next winter and spring, if American agricultural engineers and manufacturers of drying machinery can do anything to prevent it. At a conference held on the Purdue University campus in Lafayette, Ind., they looked over specifications laid before them by Wallace Ashby and Arthur W. Turner of the U. S. Department of Agriculture, and answered, "can do."

Corn picked before it is fully mature, as much of this year's crop will have to be, contains too much moisture for safe storage in cribs. In even cool weather it will grow moldy, and the heat generated by this biological process speeds its ruin.

The answer is to dry it out in the crib. Corn is cribbed while it is still on the ear, so that there are chinks and spaces through which currents of warm air can be blown. Temperatures have to be carefully regulated to prevent overheating, and of course the drying process should not be unnecessarily prolonged because it costs money. That is where the agricultural engineers come in. Each region has its own requirements, based largely on climate, so that differences must be adjusted state by state.

A corn drier consists of a burner to heat the air, usually through a heat-exchanger, plus a fan to blow it into the crib, plus of course the necessary housing and ducts. Two sizes, one with a three-horsepower, the other with a five-horsepower motor to operate the fan, were proposed by the Department of Agriculture representatives. Heating may be done with fuel oil, coal or the "bottled gas" used domestically on many farms nowadays. Blower fans are operated preferably by electric motors, but on non-electrified farms, or when motors cannot be had, gasoline engines or even the power take-offs of tractors will be used.

Drying a standard cribful of corn takes from one to three weeks, with the drier operating steadily, day and night. Time required depends, of course, on how wet the corn is, how wet the weather, and how much fuel is avail-

able for the drier's heater. Drying can be accomplished with unheated air, under Indian-summer conditions, but usually it is better to run the heater.

Twenty-eight manufacturers, most of them small firms, had representatives at the conference, and several more expressed willingness to cooperate in telegrams and letters. Serious bottlenecks are material shortages, especially sheet steel and electric motors. Since all parts are standard commercial articles, production can be rapid if materials are made available.

The Department of Agriculture intends to purchase one each of several acceptable machines exhibited. As soon as these have been tested by state agricultural engineers and results made known to manufacturers, the way will be clear to start production—if materials can be found.

Science News Letter, September 20, 1947

ASTRONOMY

Supersmall Star Is Satellite to Satellite

➤ **DISCOVERY** of a supersmall star, only one-tenth of the mass of the sun, was reported to the American Astronomical Society meeting in Evanston, Ill., by Dr. Harold L. Alden of the University of Virginia's Leander McCormick Observatory.

Extremely faint companion of a previously-known faint red star in the constellation of Cassiopeia, the new star discovery was made only because of its effect dynamically on the star system of which it is a minor member.

The visible star to which the supersmall star is a satellite is itself revolving around another star, taking between 250 to 300 years to do so.

Astronomers believe that many faint objects like the supersmall star exist in space. Each is so small that it hardly shines with its own light. Most of them will never be discovered. Only one or two have been found before.

The distance of the faint newly-found star from its companion is about five times that of the earth from the sun.

Science News Letter, September 20, 1947



Ultrasensitive RCA television camera tube cuts studio light requirements 90%

Television finds drama in the dark ***— with new RCA studio camera***

Now television becomes even more exciting as lights are dimmed, and the camera reaches deep inside studio shadows to capture action as dramatic as any on stage or screen . . .

A new studio television camera—developed by RCA scientists and engineers—needs only 1/10th the usual light.

The super-sensitive eye of the new camera is an improved Image Orthicon Tube . . . of the type once used only for broadcasts of outdoor events. With it, studio broadcasts now become sharper, clearer—and since so little illumination

is needed, heat in the studio is sharply reduced. No more blazing lights!

Such improvements come regularly from research at RCA Laboratories, and apply to all branches of radio, television, electronics, and recording. These improvements are part of your purchase of any product bearing the name RCA, or RCA Victor.

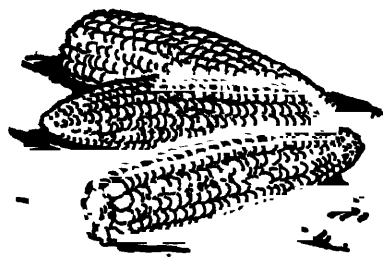
When in Radio City, New York, be sure to see the radio and electronic wonders at RCA Exhibition Hall, 36 West 49th St. Free admission. *Radio Corporation of America, RCA Building, Radio City, New York 20.*



RCA Victor home television receivers bring you every dramatic detail that the new camera catches. RCA's "Eye Witness Television" locks pictures in tune with the sending station. Let your dealer demonstrate.



RADIO CORPORATION of AMERICA



Survival of the Unfit

➤ AUTUMN is a time for seed-scattering among wild plants, but among cultivated varieties it is a time for harvesting and gathering into barns. In the wild, seed-pods open and shake out their contents as wind and animals rattle the stalks. Ripe burrs catch on the hair or wool of animals—especially, it seems after we have sheared the latter and are wearing the spoils to clothe our own too-sparsely-covered bodies. Winged and parachuted seeds are taking their final flights down the wind. All the thousand devices that accomplish dispersal are at work.

Only the seeds of grains and other food-plants chosen by man are discouraged from dispersal by every means at the breeder's command. If the heads of wheat or barley or rye break up and let go their grain, as grass seeds naturally scatter, the agronomist reports disgustedly to the geneticist, "This kind shatters!"—and the offending variety is straightway discarded, or at least bred into tight-clinging docility. If bean-pods or clover-heads shed their contents without waiting for the thresher, a like fate awaits the strains to which they belong.

Among the commoner crop plants, probably the one that has most completely lost its ability to let go of its own seed is corn. This has been artificially selected by farmers, both white and Indian, for so many generations that all resemblance to its original wild condition has been lost. And in no respect has its ability to look out for itself been more completely lost than in the way its many-rowed cob clings to the grain. Not even in warmer countries, where the seed would not, be

winter-killed, does corn escape from cultivation and run wild, as other plants occasionally do.

If man has become greatly dependent on his cultivated plants for his survival, they have become utterly dependent on him. He must thresh out their seeds, saving a part from his ovens and pots to be planted the following year.

NUTRITION

Too Much Fat Is Bad

If you habitually eat as much as four big pats of butter every meal, beware of hardening of the arteries, scientist warns.

➤ THIS is a story in favor of Jack Spratt, and it is a bit tough on his wife.

Eat fat to excess and you run the risk of a fatty degenerative kind of arteriosclerosis, hardening of the arteries to you.

Medical scientists have warned against eating too much fat for years. Your doctor may have warned you about it if you are a bit on the plump side.

But this work is not just the old stuff. It is a new warning to excessive fat eaters. It is a warning to those who habitually eat four big pats of butter (about one-fourth cup) or other fat per meal.

Dr. John E. Moreton has been studying arteriosclerosis in Salt Lake City at the Tyree Memorial Laboratory for research on that disease.

He has been making tests on people. And also rabbits and steers. He tells the scientific world in a report to the journal, *Science* (Aug. 29).

When a man eats about two ounces of butter fat, a shower of big fat particles descends on his blood stream about four hours later. It makes it look like the blood picture seen in certain conditions of excess fat in the blood, as in some cases of diabetes. Compared with the blood plasma of a normal person who has been fasting or has eaten a meal without fat, there are both more and bigger fat particles.

When these big fat particle showers descend into the blood stream time after time for many years, so many of them get into the walls of the blood vessels that in time they damage these walls.

It is not just the amount of fat but the physical state in which it gets into the blood that is important, Dr. Moreton emphasizes. He says scientists have in the past missed this clue to the under-

lying cause of the fatty degenerative kind of arteriosclerosis. They missed it because they only studied the concentration, or proportionate amount, of fat in the blood.

Science News Letter, September 20, 1947

Circumstantial evidence supporting his theory comes from such facts as the rarity of the fatty arteriosclerosis in people eating very little fat, such as the Chinese and Okinawans; the marked decrease of the condition in Germany during the fat-shortage years after World War I; and its more common occurrence in very fat, over-nourished people than in the lean and under-nourished.

One more warning: Check your diet with your doctor before you start changing it. A person with diabetes, for example, may need quite a lot of fat. The doctor, not the patient, can tell how much.

Science News Letter, September 20, 1947

Salt mines, at Blanco de la Republica, Colombia, are to be extended and a plant erected to produce soda ash, caustic soda and chlorine.

YOUR HAIR AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as:
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Books of the Week

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AIR CONDITIONING—Herbert and Harold Herkimer—*Chemical Pub.*, 692 p., illus., \$12.00 Text for students and engineers. It reviews the laws of chemistry and physics, as well as treating in detail the more practical aspects of the field, e.g., costs, installation, equipment, etc.

COLLOID SCIENCE, A Symposium—*Chemical Pub. Co.*, 208 p., illus., \$6.00 Series of lectures under the auspices of Royal Institute of Physics and sponsored by Dept. of Colloid Science, Cambridge Univ., dealing with disperse systems including emulsions, foams, colloidal electrolytes and polymers

THE DEVELOPMENT OF MODERN MEDICINE, an Interpretation of the Social and Scientific Factors Involved—Richard Harrison Shryock—*Knopf*, 457 p., illus., \$5.00 Revised and enlarged edition of 1936 work correlating history of medicine and history of public health against background of intellectual and social history in general

HARNESSING THE RAINBOW FOR YOU—*E. I. duPont de Nemours & Co.*, Wilmington, Del., 8 p., illus., paper, free. An informative little booklet of questions and answers about dyes and the American dye industry

HUMAN RELATIONS, a Quarterly Journal of Studies towards the Integration of the Social Sciences—*Research Center for Group Dynamics, Tavistock Inst.*, \$7.00 per vol. First issue of a British journal devoted to community problems and especially to the collaboration of the various social sciences in relating social theory to social practice.

IF A MAN BE MAD—Harold Maine—*Doubleday*—435 p., \$3.00. A former alcoholic tells of his own experiences as a patient and as an attendant in mental hospitals.

NOW TRY THIS—Herman and Nina Schneider—*Wm. R. Scott*, 40 p., illus., \$1.50. The second "Let's Find Out" Science Book for young children explains the principles of physics: friction, levers, rollers, wheels, and bearings. Cartoon-type illustrations of familiar examples make it both easy and fun to understand

ONE TWO THREE . . . INFINITY—George Gamow—*Viking*—340 p., illus., \$4.75 Facts and theories of modern science presented in everyday language and covering the world of atoms, planets, genes, fourth dimensions and the laws that govern them.

PERSONALITY. A Biosocial Approach to Origins and Structure—Gardner Murphy—*Harper*, 999 p., illus., \$5.00. A text for advanced and graduate students surveying the major facts of personality development from point of view of dynamics of growth and normal interaction with social environment rather than upon clinical applications.

QUALITATIVE ANALYSIS AND CHEMICAL EQUILIBRIUM—T. R. Hogness and Warren C. Johnson—*Holt*, 3rd ed., 553 p., \$3.20. This text uses laboratory experiments in qualitative analysis to illustrate that basic principle of chemistry, chemical equilibrium. Semi-micro methods are employed.

THE REACH OF THE MIND—J. B. Rhine—*Wm. Sloane Assn.*, 234 p., illus., \$3.50 A description of experiments which the author believes demonstrate the reality of telepathy, precognition and the influence of the mind over dice.

SECRET—Wesley W. Stout—67 p., col. illus. Free from Chrysler Corp., Detroit, Mich. Simply written and beautifully illustrated story of the atom bomb and the part Chrysler played in helping science and industry get control over the energy locked in the atom

UNASYLVA—*FAO Div. of Forestry and Forest Products*, bimonthly, illus., \$3.50 per year. First issue of magazine designed to encourage careful management of forests as a world resource by making available the increasingly complex information necessary for wise utilization of the forests and their products.

Science News Letter, September 20, 1947

Insects in containers carried many miles high above the earth's atmosphere in V-2 rockets and dropped to the ground by parachutes seem to have escaped injury either from the tremendous speed or the heat of flight.

NUTRITION

Vitamin Chemical Reported Helps Mothers Feed Babies

➤ A VITAMIN chemical that will help mothers feed their babies better has been discovered by Mohamed El Shahat, biochemist in the medical school of Fouad 1st University at Cairo, Egypt. Dr. Shahat calls this chemical the "H" lactation-promoting factor, "H" standing for human.

Small doses of it enable human mothers to produce both more and richer milk for their babies. The volume of milk increased in 158 cases by 160% to 900%. The larger increases occurred at the earlier stages of lactation, soon after the baby's birth. The amounts of fat, proteins, sugar, minerals and vitamins in the milk also increased, so that the milk was more nourishing.

The "H" factor was obtained from fenugreek oil. Fenugreek is a plant whose oily seeds have been used for poultices and in veterinary medicine. Dr. Shahat announced his discovery of the "H" factor at the meeting in London of the Eleventh International Congress of Pure and Applied Chemistry.

Science News Letter, September 20, 1947

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by ROBERT FRANK

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☛ **TABLE LAMP**, whose supporting stand glows in the dark, is easy to find even in an unlighted room. The upright column of the stand is made of 14 oyster-like plastic shells, one above the other, each treated with a phosphorescent pigment that causes the glow.

Science News Letter, September 20, 1947

☛ **COFFEE BREWER**, of the vacuum type, is fully automatic. It operates on household alternating current without setting of switches or adjusting levers of any type. The housewife puts water in the lower bowl and ground coffee in the upper; the rest takes care of itself.

Science News Letter, September 20, 1947

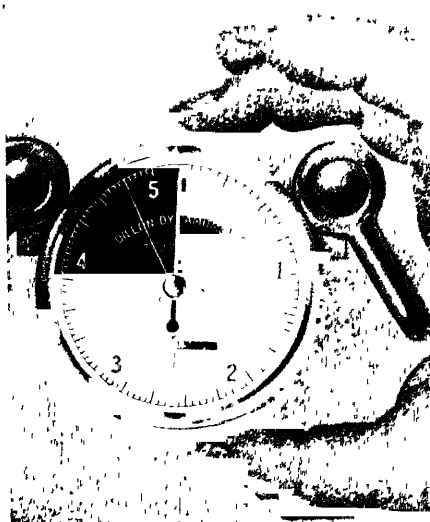
☛ **ELECTRIC VIBRATOR** for home use is cased in a light-weight plastic housing, and is shaped for easy holding. Four accessories may be attached to the stem of the vibrator. These are a roller, rubber fingers for the scalp, rubber cup for tired muscles, and a rubber cap for gum massage.

Science News Letter, September 20, 1947

☛ **CRAFTSMAN KIT**, with which the amateur can internally carve beautiful flowers encased in crystal clear plastic, contains everything needed for the job except a small hand-powered tool or flexible shaft. Costume jewelry with internal carving of colored objects can be made by a layman.

Science News Letter, September 20, 1947

☛ **MINIATURE dynamometer**, an instrument to measure force exerted or



power expended, is a three-inch version of larger types. Said to be the smallest of its kind, it is available in 100, 250, and 500 pounds capacity. Its relative size is shown in the picture.

Science News Letter, September 20, 1947

☛ **MICROSCOPE LAMP**, or miniature light for general purposes, gives a cool light intensity from a twin pair of fluorescent tubes in a casing about six inches long. To operate the portable lamp, a plug-in type ballast at the end of a six-foot cord is inserted into a power socket.

Science News Letter, September 20, 1947

☛ **ACETYLENE GENERATOR**, designed by Army Air Forces engineers as

a portable device for field use, is used with a standard 55-gallon steel fuel drum to which it can be easily attached. The portable unit which is attached to the drum weighs 48 pounds and has a capacity of about 25 pounds of carbide.

Science News Letter, September 20, 1947

☛ **PORTABLE light tower and generator unit**, designed for night construction projects, is mounted in a truck trailer with the hinged tower in a horizontal position during moving. When erected, the 3,000-watt light tower is 18 feet high; the lights at its top are pivot-mounted and have adjustable beam and spread.

Science News Letter, September 20, 1947

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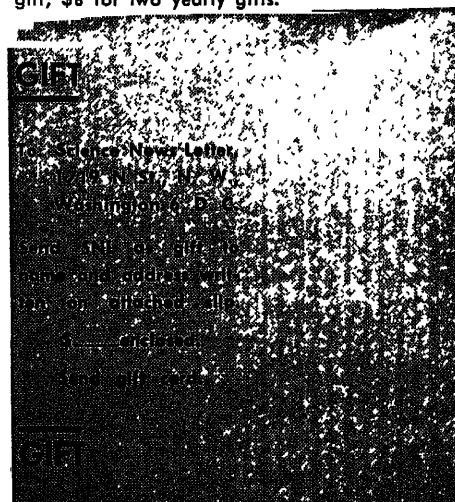
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PSYCHOLOGY

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Photographs: Army Air Forces, p. 179, p. 181; H. K. Ferguson, p. 183.





SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION

CHEMISTRY-MEDICINE

Hormones Synthesized

Most potent "essence of femininity" made artificially and cheaply to provide relief for women in middle age.

► THE MOST potent chemical "essence of femininity" ever concocted has been made artificially from simple, cheap chemicals, the American Chemical Society was told by Dr. Carl Miescher of the Swiss Ciba Company. This chemical, which is a female sex hormone effective in very small amounts, provides "relief for women undergoing the difficult transition associated with middle age."

The newly available "love chemical" is called a doisyonic acid in honor of Dr. A. E. Doisy of St. Louis University School of Medicine who in 1933 first pointed out its estrogenic or sex-promoting activity. A German process was

used to manufacture the particular compound bis-dehydrodoisyonic acid, which can be taken by mouth and does not have undesirable effects when administered medically.

This valuable drug is available in practically unlimited quantities in Europe, where it is being widely used, Dr. Miescher reported.

Another synthetic sex hormone, one that helps prevent miscarriages, was reported by Dr. Maximilian Ehrenstein of the University of Pennsylvania School of Medicine. The new drug, anhydrohydroxyprogesterone, can be given by mouth, whereas the synthetic version of the natural hormone must be injected.

Science News Letter, September 27, 1947

MEDICINE

New Triumphs Against TB

Physicians report enthusiastically on successes with streptomycin in treating various complications of the disease.

► NEW TRIUMPHS of streptomycin over tuberculosis and its complications are enthusiastically reported by investigators in different parts of the country.

A Chicago physician, Benjamin L. Brock, cites the healing action of streptomycin on 60 draining sinuses attacked by tuberculosis germs in 12 patients treated in the Veterans Administration Hospital at Oteen, N. C., of which he was formerly clinical director.

All but two of the patients had draining sinuses which originated in bone. The sinuses existed on the average about 24 months before treatment was begun. Laboratory tests proved that they were of tuberculosis origin.

Half the patients received treatment for 90 days and the other half for 150 days by injection of the drug into the muscles. The abscesses were allowed to drain, to facilitate healing.

The results were impressive, declares Dr. Brock, (*Journal American Medical Association*, Sept. 20). Eleven of the 12 patients showed outstanding clinical signs of improvement, displaying a

sense of well-being, an increase in appetite and a gain in weight. Nine of the 60 sinuses closed within one to four weeks and nine closed within six to eight weeks after the administration of the antibiotic was begun. It required between 10 and 12 weeks for 30 of the sinuses to close, and 11 closed within 13 to 20 weeks after beginning of treatment. Only one of the 60 original tuberculous sinuses continues to drain, but even this one has shown improvement.

Another complication, tuberculous meningitis with widespread tuberculosis bacilli throughout the body, which has usually been fatal in the past, was completely arrested following treatment with streptomycin, according to Drs. Emanuel Appelbaum and Cyrille Halkin of New York.

Approximately nine months after the beginning of illness the patient was free of symptoms and appeared normal physically and mentally without the involvement of the nervous system which has usually followed streptomycin treatment of this disease.

The doctors, who are from the Bureau of Laboratories, New York City Health Department and the Willard Parker Hospital, ascribe the good results to the fact that treatment was begun early in the disease and the sensitivity of the organism to the drug.

In another patient treated with streptomycin for meningitis complicated by tuberculosis at the Oakland County Tuberculosis Sanatorium, Pontiac, Mich., the progress of the disease was halted after 175 days of drug injections. Drs. C. P. Mehas and Wayne E. Truax declare that the favorable results were due to early diagnosis and treatment. However, the patient did display a slight hearing loss.

Science News Letter, September 27, 1947

MEDICINE

Unightly Polio Shoes Destined for Scrap Pile

► THE UNSIGHTLY cork or wooden high sole on the shoe of an infantile paralysis cripple is destined for the scrap pile. The reason is that orthopedic surgeons are finding more and better ways of giving the polio victim legs of equal length after the disease has shortened one of them.

Eventually the time may come when no child will need to face adult life with the handicap of the high-soled shoe, Dr. Joseph Barr of Boston declared at the Georgia Warm Springs polio treatment center's twentieth anniversary.

Exactly how many polio victims are left with one leg shorter than the other is not known. About one-third of the patients treated at the Massachusetts General Hospital's outpatient department who got the disease before the age of 16 developed marked inequality in leg length, Dr. Barr said.

The greatest shortening occurs in young patients with one normal and one severely paralyzed leg.

In grown-ups, the surgeon can equalize the legs either by lengthening the short one or shortening the long one. Shortening the long leg seems to be the preferred method, Dr. Barr said.

In the growing child equal leg length may be achieved in many cases by arresting the final development of the ends of the bone. This normally takes place at the end of the growing period and stops further growth.

Cutting certain nerves from the spine to the legs is another method sometimes used to equalize leg length. Its value is still a matter of debate among surgeons.

Science News Letter, September 27, 1947

CHEMISTRY

Curium Is Isolated

Number 96 in the atomic table, curium is the heaviest and most violently radioactive of the chemical elements and therefore the most dangerous to handle.

See Front Cover

➤ THE human eye has seen for the first time the heaviest and most violently radioactive of the chemical elements, curium, number 96 in the atomic table.

Isolation of curium was announced by Dr. Isadore Perlman, of the University of California, to the American Chemical Society meeting in New York.

The world's total supply, barely visible to the unaided eye, is a speck of a whitish-yellowish hydroxide that bubbles and glows softly with radioactivity.

The picture of curium on this week's cover was photographed in a dark room by the visible light given off by the curium itself. The specimen is contained in a small hollow glass needle, in the upper part of which a few drops of the glowing curium are clinging. The black shadow at the bottom is the needle's solid tip.

It transmutes itself at the rate of one-

half per cent a day into the atom-bomb element, plutonium. It is the most dangerous of all the elements to handle.

Chemists hailed its isolation by L. B. Werner as one of chemistry's most difficult separations because curium is so like americium, element 95, from which it was made by intense neutron bombardment in the atomic pile.

Not content with creating elements unknown in nature and converting matter into atomic energy, scientists are planning to make high-voltage machines of such power that energy can be converted into matter.

Science News Letter, September 27, 1947

CHEMISTRY

Chemists Not Agreed On Name for Element 61

➤ CHEMISTS had a hot controversy on their hands over the naming of element 61, the only one of the 96 on

which there has not been general agreement.

The name "prometheum" was proposed at the meeting of the American Chemical Society by Drs. J. A. Marinsky and L. E. Glendenin, once at Oak Ridge and now at MIT, chemists who discovered relatively large quantities of two isotopes of this element in the fission products of uranium as produced in the atomic bomb.

The name is based on that of the god who according to mythology is the one who brought fire to the earth. Other prior claims of discovery have suggested illinium, florentium and cyclonium as names for element 61.

Science News Letter, September 27, 1947

CHEMISTRY

Lignin Synthesis Aids Understanding

➤ LIGNIN, the puzzling compound that makes up about half of wood and most of chemical wood waste, has been made synthetically in the Northern Regional Research Laboratory, U.S. Department of Agriculture, Peoria, Ill., the American Chemical Society meeting in New York was told by Dr. Alfred Russell.

Not that there is such a need for lignin that its synthetic production is called for; on the contrary, there is an embarrassing surplus of it at present. But the chemical makeup of lignin has never been at all clearly known, and a synthesis of what appears to be an identical compound will aid in a chemical understanding of the natural substance, and perhaps to an earlier discovery of practical uses for it.

There is more than one kind of lignin, and the kind that Dr. Russell has duplicated in the laboratory is found in the wood of pines, spruces and related trees. He made it by a rearrangement of the molecules of an already known compound, vanillin monoacetate.

Science News Letter, September 27, 1947

ZOOLOGY

Coconut Crabs from Bikini Brought to National Zoo

➤ THREE coconut-stealing land crabs from Bikini have just been placed on exhibit at the National Zoological Park in Washington. They were collected on one of the islands of the famous atoll by F. M. Bayer of the U. S. National Museum.

They are handsome brown crustaceans, with bluish highlights. The largest has a shell about a foot across. In addition to



BIKINI CRABS—This boy is looking through a glass at three coconut-stealing crabs from Bikini which have just been placed on exhibit at the National Zoological Park in Washington.

ripe coconuts, they will eat any only fruit such as avocado, as well as meat and fish. And big land crabs will eat little land crabs if they get a chance.

These land crabs are great nuisances wherever coconuts are grown commercially. They climb up the trees and cut

off the nuts, then climb down again to open and eat them. In Tahiti their name is *ua vahi haari*, which means the crab that breaks coconuts. To zoologists they are *Birgus latro*—*latro* being Latin for thief.

Science News Letter, September 27, 1947

CHEMISTRY

"Solid" Gasoline Desired

French chemist working for U. S. Army seeks solid of varying hardness that will burn but will not explode. Still question whether envelope or solid achieved.

➤ SOLID chunks of gasoline are being developed by a French chemist working for the U.S. Army.

First leak in the secrecy surrounding solidified gasoline came in a French English-language news sheet issued in New York. The publication said that the chemist, Pathus-Labour, had made an "envelope" which permitted gasoline to be handled like a solid and without danger of fire.

An Army spokesman has disclosed that M. Pathus-Labour is now in the United States at the U.S. National Bureau of Standards developing his discovery under contract to the Office of the Quartermaster General of the Army.

The new process is not an envelope or packaging process but solid gasoline itself, Army sources insist. Solid gasoline, they explain, can be made in varying degrees of hardness. Some chunks of gasoline are a spongy, soft solid.

Solid gasoline will burn but not explode, it was reported.

Either solid gasoline or the packaging process can mean safer, more efficient handling of gasoline. A filling station attendant of the future may take a tankful of fuel off his shelf and hand it to you, if the process is practical for general use.

Drums, cans, tank cars and trucks and modern steamship tankers might give way to standard, less specialized means of storage and transportation with solid gasoline.

Details of the Frenchman's solid gasoline process are cloaked in official secrecy, as the project is termed "highly classified."

French report of M. Pathus-Labour's work was made in this country in "Courrier de France," a weekly news sheet, issued under the letterhead of the Information Service of the French Embassy.

The French description said that the chemist had produced a new product related to cellulose and called "carburo-lithe." Carburolithe is termed a non-inflammable film for covering gasoline so that the liquid fuel can be handled as a solid.

Gasoline, wrapped in this film, can be put into a fuel tank without any change in the tank other than a device for ripping open the covering, according to the French source. Carburolithe changes directly into a gas from the solid state so that there is no residue in the tank. Cost of the coating material is said to be less than \$2 per ton.

The French said that the U.S. was carrying on investigation of the gasoline process, because "the French government does not wish to engage in expensive research at this time." The U.S. Army will get a non-exclusive permit to use the process in return for aiding the French chemist, it was indicated.

The French story of Pathus-Labour's work differs sharply from the U.S. Army version. Here, the process is declared to be one for making solid gasoline. Either development could revolutionize the storage and transportation of gasoline.

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ZOOLOGY

Toads, Free of Cancer, May Be Guarded by Venom

➤ DOES the toad's venom guard it against cancer as well as natural enemies?

This question has been raised, but not answered, by researches of Dr. Joseph Skapier of New York.

He examined 25,000 European toads, collected on the outskirts of Paris, and 25,000 North African toads from Algiers. Not one of the toads had cancer. These are the only animal species free from cancer at present known.

Dr. Skapier and his colleagues tried to produce cancer in 100 toads of mixed variety by putting powerful, cancer-producing chemicals on their skins. These failed to cause cancer, but the toads all died within 15 to 25 days after the beginning of this experiment. Death resulted from the poisonous effect of the chemicals.

"The role of the toad's venom in the 'immunity' against spontaneous or induced carcinoma cancer is being considered for investigation," Dr. Skapier said.

Various attempts to produce cancer experimentally in most cold-blooded vertebrate animals, he also pointed out, have failed.

Science News Letter, September 27, 1947

SCIENCE NEWS LETTER

Vol. 52 SEPTEMBER 27, 1947 No. 13

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year, two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N. Y. C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439.

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CHEMISTRY

Slow Action Insulin Made

Diabetics need only one injection per day of this new insulin which has been combined with part of the blood's red color chemical, hemin.

➤ A NEW slow action insulin for diabetes has been made by combining regular insulin with part of the blood's red color chemical. Method of preparing it was reported by Drs. Richard G. Roberts, Doris M. Hilker and Adrian Gasior-Russell of the Chicago Medical School at the meeting of the American Chemical Society in New York.

Diabetes will only need one injection per day of this new insulin, instead of the two to four often required when plain insulin is used, the Chicago chemists predicted on the basis of tests with rabbits.

The blood chemical used to prolong insulin's action is hemin. It is part of the hemoglobin which gives blood its red color and carries oxygen throughout the body. The fact that it comes from blood and is therefore not foreign to the body is said to give it an advantage over protamine, another chemical which has been combined with insulin to prolong its action.

Besides hemin from blood, the new insulin compound contains choline. This chemical, sometimes called a vitamin and sometimes a hormone, plays a role in the body's utilization of fat. Insulin controls sugar utilization. Choline, when given to diabetic patients with fatty livers, permits lowering of their insulin dosage, according to the report to the chemical society.

Science News Letter, September 27, 1947

BIOLOGY

Life-Form Samples Sealed For Two-Century Siege

➤ SOME time in the year A.D. 2147 a group of biologists, whose great-grandfathers haven't even been born yet, will gather on the Notre Dame campus to lift a dusty copper box out of a hollow stone block. Cutting it open, they will find a collection of living organisms, viruses, vitamins, etc., in sealed glass tubes, all carefully labelled with India ink on linen.

The opening of these tubes will be the conclusion of a long-range experiment to be started when Prof. James A. Reymers, director of Notre Dame's laboratories of bacteriology, placed this carefully selected and prepared collection of representative life forms in the cornerstone of the University's new Laboratory for Germ-Free Life just before its formal laying by the Most Rev. Lawrence L. Graner, C.S.C., D.D., bishop of Dacca, India.

New buildings at the University of Notre Dame are planned to last at least a century, and possibly two centuries. The bacteria, viruses, protozoa, fungi, insects and other lower life forms sealed into the cornerstone will have a good chance to demonstrate their longevity. Samples of penicillin, streptomycin, amino acids and vitamins can show whether or not they retain their properties for 10 or 20 decades.

Sealed in, also, will be specimens representing the present laboratories' unique activities: samples of tissues from animals born and reared with no germs in their bodies, together with microfilm copies of books and articles telling how they were reared, and film and wire recordings of the voices of the scientists now at work here.

Finally, as representing the physical environs of the University of the present time, there will be sealed-in samples of sand, clay and fertile loam from the neighborhood, as well as tubes of recent rainwater and of water from Notre Dame's lake. All these have populations of microscopic life forms. It will be interesting to the biologists seven human generations hence to compare the survivors, if any, with the forms living in the same places then.

Science News Letter, September 27, 1947

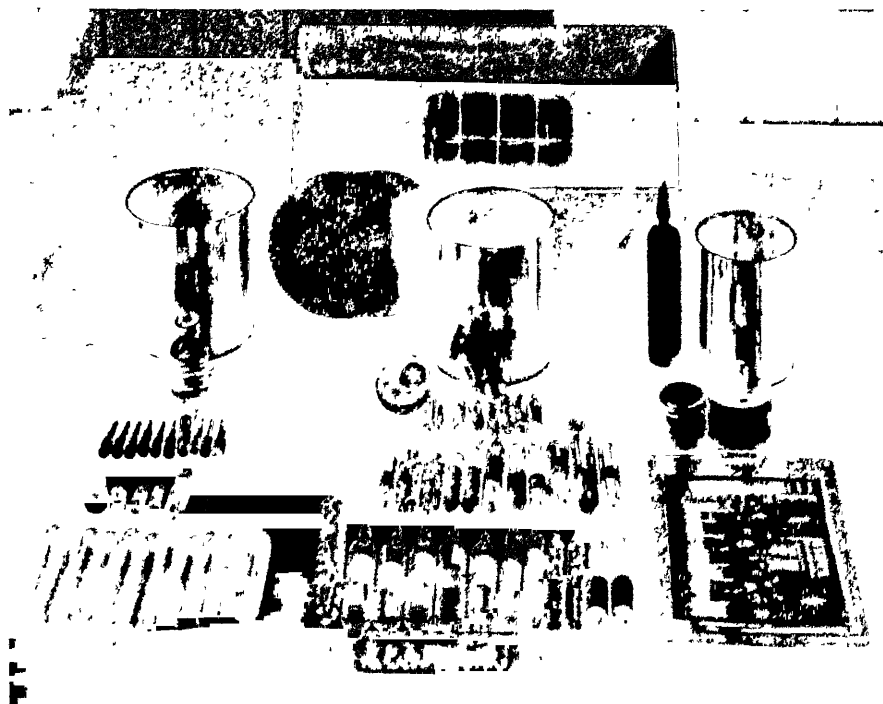
PHYSICS

Cosmic Rays Being Counted In Subway Station

➤ COSMIC RAYS, which have been counted in V-2 rockets at an altitude of more than 100 miles and deep in the earth in mines, are getting a new check-up underground, two English scientists have disclosed. (*Nature*, Sept. 6.)

The mysterious particles from outer space are being counted by E. P. George and A. C. Jason of Birkbeck College, University of London, in a unique laboratory under London. The scientists have their counting equipment set up in the Holborn subway station.

Science News Letter, September 27, 1947



SCIENCE FOR FUTURE—Samples of many life-forms sealed in cornerstone of the new research building at Notre Dame.

ENGINEERING

Synthetic Crystals in Use

Replace natural quartz in telephone circuits. Are made from tiny "seeds" in a solution of ethylene diamine tartrate.

➤ MAN-MADE crystals to replace the natural quartz widely used in telephone circuits are already in successful use, the Bell Telephone Laboratories revealed. They will replace some 90% of the quartz used in long-distance telephone systems, it is expected.

Quartz crystals, or an equally good substitute, are essentials in radio transmission and long-distance telephony. They are able to convert mechanical energy, such as sound waves, into electrical energy, or they can reverse the process. Scientists say they have piezoelectric properties. Many other materials have the same property but in the past quartz has been the most practical to use because of reliability and moderate cost.

During the war, quartz crystals for electrical work stood high on the list of essentials in short supply. One great use of the crystals is in radio, where they are employed in transmission sets to regulate the frequency of outgoing waves. Little quartz suitable for electrical applications is found in the United States; most is imported from Brazil, and the war drain has made that source short.

In long-distance telephony, crystals which will vibrate with unvarying frequency when electric currents are applied to them are used in sending many conversations over the same wires at the same time. These conversations create electrical waves of different frequencies; the crystals guide each conversation into its proper channel.

Chemically, the new crystals are markedly different from quartz. They are ethylene diamine tartrate, EDT for short. They are "grown" from tiny "seeds" in a solution of the chemical. The seeds are made from the same chemical by evaporation. The large crystals formed finally weigh about a pound and are about six inches in length and two by three inches in cross-section.

These full-grown crystals are cut into plates, roughly an eighth of an inch thick and about one inch long. They are then coated with an extremely thin film of gold, which serves as an electrical connection. They are then mounted in a glass envelope to form the completed crystal unit.

Science News Letter, September 27, 1947

CHEMISTRY

New Uses For Sand Found

Important perfumes, flavors and dyes made chemically from silicon, basic element of common sand. Distance between molecules, forming ring, have been measured.

➤ NEW and important perfumes, flavors and dyes fashioned chemically out of silicon, the basic element of common sand, are possible through a new class of compounds reported by two Cornell University chemists to the American Chemical Society meeting in New York.

A preliminary exploration forecasts a series of silicon compounds that parallels in many respects the famous aromatic compounds of carbon responsible for most of the synthetic odors, tastes and colors around us in the modern world.

The Cornell scientists, Drs. E. H. Weller and S. H. Bauer, have made measurements upon a silicon ring in

many respects comparable to the benzene ring of carbon. Aromatic compounds are based upon the benzene ring structure in which six carbon atoms join hands to form a remarkably stable chemical group. Silicon atoms, similar to carbon in many ways, call upon the sister-element oxygen to help them form a similar ring.

This "siloxane" ring has the full name: hexamethylcyclotrisiloxane. So exactly has the ring been measured by Drs. Weller and Bauer that they know the distances between the molecules and the angles at which they are distributed with reference to each other in space.

Silicon and oxygen atoms join alternately to form a flat ring. Carbon and hydrogen atoms, which are the methyl part, make a sort of fence at right angles around the outside.

Whether the siloxane ring will form sweet-smelling compounds as the benzene ring does is not yet known, but the Cornell chemists say the chemical they measured is only the first of a long series analogous to the carbon polymers that are marvelous new fibers, textiles and plastics we now use every day.

Already silicon has mimicked carbon to form a whole family of silicon chain compounds—vapors that waterproof, liquids that lubricate and solids with remarkable properties. Now silicon promises to rival carbon in the making of ring compounds of great future promise.

Science News Letter, September 27, 1947

MEDICINE

Nitroglycerin Aids in Diagnosis of Migraine

➤ SUFFERERS from the recurrent agonizing headaches of the type known as migraine can have their ailment more accurately diagnosed if the attending physician will give them brief headaches of the same kind by administering a light dose of nitroglycerin, then quickly curing the purposely induced pain.

This suggestion is offered by two Toledo physicians, Dr. Max T. Schnitker and Dr. Maurice A. Schnitker (*Journal, American Medical Association*, Sept. 13). It is sometimes difficult to distinguish between migraine and the type of headache known as histamine cephalgia, they point out.

Migraine pain is caused by the over-expansion of the external carotid artery, principal carrier of blood to the head. A very small dose of nitroglycerin can reproduce this swelling and thus bring on the headache. If the patient's ailment is histamine cephalgia, nitroglycerin will not reproduce it, though a light dose of histamine will.

Purposely induced migraine attacks can usually be stopped by simple pressure on the carotid artery. If this does not work, breathing 100% oxygen for five minutes, or the administration of from one-half to one milligram of ergotamine tartrate, will stop the pain. The condition is permanently corrected with calcium lactate medication, or with phenobarbital or by the elimination of the allergens that are sometimes found to be responsible.

Science News Letter, September 27, 1947

NUTRITION

Vitamin Increase Studied

Sweet potatoes' content of B-1 is found to increase 25% when cooked. New nutritional factor "X" discovered in milk.

➤ **HEATING** vegetables is commonly supposed to cut their vitamin content—so much so that the eating of salads and other forms of raw vegetables has become a modern cult. Yet at least one vegetable has at least one of its vitamins actually increased by moderate heating. E. F. Kohman and A. A. Rugola of the Campbell Soup Company told the meeting of the American Chemical Society in New York. Sweet potatoes' content of thiamin, or vitamin B-1, was increased 25% when the roots were gently heated to a temperature just below the boiling point.

Sugar content in sweet potatoes increases after harvesting, and goes up again when they are cooked, the two chemists declared. This latter sugar increase is due to the action upon their starch of certain enzymes that are effective at temperatures high enough to destroy most enzymes.

Disease Reacts to Vitamin

Children suffering from the rare but highly fatal disease known as cystic fibrosis of the pancreas may have their lives saved by a predigested form of vitamin A. Dr. A. B. McCoord and associates of the University of Rochester told the meeting. Young sufferers from this pancreatic ailment are unable to absorb vitamin A in their food. A predigested alcohol form of the vitamin, however, is readily taken up.

"X" Nutrient Aid to Health

"X," an unknown vitamin or other nutritional factor in milk and its non-fatty products, was introduced to the chemists by A. M. Hartman and C. A. Cary of the U. S. Department of Agriculture. "X" is present not only in milk but in skim milk, in commercial skim-milk powders, and in cheeses of the Swiss, Cheddar and cottage types; also in lean pork and veal and in green leaves. It does not occur in any kind of flour, cornmeal, soybean or cottonseed oil meals, or in yeast or egg white. It is found in high concentration in liver

extracts used in the treatment of pernicious anemia.

Young rats nursed by mothers kept on "minus-X" diets fail to grow normally and as a rule eventually die. Ill effects of the lack are quickly offset by adding "X" in supplementary rations. Although "X" has not yet been identified, concentrated preparations have been made that are highly potent in offsetting its lack in experimental diets.

Science News Letter, September 27, 1947

RADIO

Fifteen-Pound Radar Warns Pilot of Mountains

➤ **ALL PLANES** of the Trans-World-Airline (TWA) are now being equipped with the new Howard Hughes radar anti-collision device. This apparatus can be set to give automatic warning of mountains or earth either 2,000 or 500 feet ahead or below.

This radar transmitter-receiver set is in a box unit nine by eight by 15 inches in size which weighs, together with

antenna, cable lengths and instrument panel warning lights, approximately 15 pounds. Its power is obtained from the plane's battery at 28 volts.

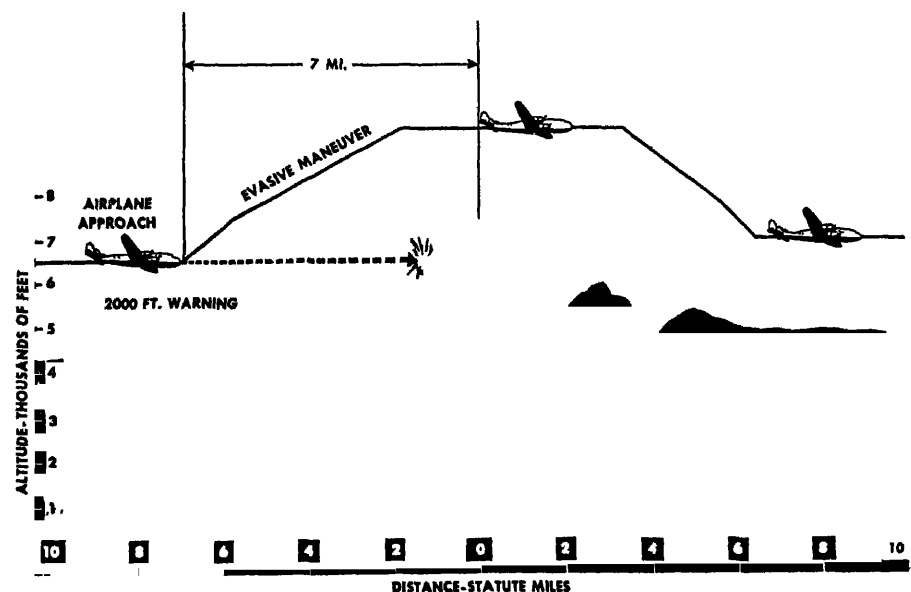
The radar antenna used is a single V-shaped pole mounted on the belly of the plane just behind the leading edge of the wing. It gives coverage of the entire hemisphere below the ship, including straight ahead. It does not give coverage for the space above. The radar set has no adjustments to be made during flight except a single switch to select the 2,000 or the 500-foot operating range.

When approaching a high mountain peak, the first warning received by the pilot will usually not be radar echoes from the peak itself but those from the foothills below. These are on most mountain approaches, and may extend from a few to 30 miles from the mountain itself. The warning gives the pilot plenty of time to climb to a safe altitude.

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America has *cows* that produce 55 quarts of milk a day, although the average is only nine quarts; it has *hens* that lay an egg nearly every day of the year, more than twice the average.

Lacquer trees, from which lac is obtained to make the widely used finish, are male or female; only female trees produce seed, the lac is obtained from the male.



ANTI-COLLISION DEVICE—The radar antenna is mounted on the belly of the plane and warns the pilot of terrain 500 to 2,000 feet ahead or below. All TWA planes are now being equipped with this device.

MEDICINE

Sulfa Cures Meningitis When Other Remedies Fail

➤ SULFA drug cures of meningitis in cases in which penicillin and streptomycin failed were reported by Drs. A. A. LaLonde and W. James Gardner of Cleveland at the meeting of the American College of Surgeons in New York.

The sulfa drug was made more efficient, or potentiated as the scientists phrased it, by giving with it another chemical, urea.

One of their patients was a 31-year-old man who had a bad skull fracture. Penicillin and sulfadiazine were given in the hope of warding off the meningitis which the doctors feared would occur. But meningitis developed while the patient was getting these two drugs. Streptomycin was then given by injection into the spinal canal, but this had to be stopped because it gave him excruciating leg pain. Sulfadiazine was then given with urea and the patient got well.

Penicillin and streptomycin have gotten so much attention, the doctors pointed out, that the good results which can be obtained with sulfa drugs and urea have been overlooked. They think this combination of drugs should be used more often.

Science News Letter, September 27, 1947

ASTRONOMY-METEOROLOGY

Starlight During Day Measured to Predict Rain

➤ ASTRONOMERS measuring the brightness of stars in broad daylight with new sensitive instruments may help future weather forecasters tell you when it will rain.

Daytime measurements of the light from stars were described to the American Astronomical Society, meeting in Evanston, Ill., by Dr. John Hall, Amherst College astronomer. Dr. Hall reported that he had used photo-electric cells with both a photomultiplier tube and an infra-red-sensitive lead sulfide cell to make the difficult light measurements.

In addition to giving astronomers more starlight data, the daytime measurements will help meteorologists study how much potential rainwater is in the air overhead.

U. S. Weather Bureau scientists in Washington said that the new techniques may give a new, 24-hour system of keeping track of the water vapor in the air.

completion at the Weather Bureau will be used only during sunlight hours. Starlight can now reveal the sky's secrets around the clock, both day and night, with Dr. Hall's equipment.

He separates light of the stars from the total light from the sky, even when the sun is shining, by varying the starlight at a fixed frequency while the other light is kept constant. The photomultiplier tube which can be used with a photoelectric cell to separate the starlight is produced by the Radio Corporation of America, while the lead sulfide cell which is sensitive to infra-red light was at the heart of the wartime snooper scope and other infra-red devices.

Possible uses which astronomers may make of the new starlight measurements include measuring the magnitude of faint stars in bright moonlight and observing the daylight paths of stars across the heavens.

Science News Letter, September 27, 1947

ENGINEERING

Roof-Top Roads Planned To Relieve City Traffic

➤ BRITAIN will have roof-top roadways for city through-traffic if proposals to the British Association for the Advancement of Science are put into effect.

The road would rest on the tops of 100-foot-high business buildings with cross streets bridged. Access spurs would be provided every mile or so.

English cities, like many in other parts of the world, have traffic problems growing more difficult year by year. One solution might be underground roads, another elevated routes, above present streets, supported by heavy steel trestlework. Both are expensive. Utilizing the same steel framework to support both the building structure and the roadway on the roof would be far less costly, it was claimed.

Roof-top roads would have other advantages, it is argued by their proponent, Wing Commander T. R. Cave-Browne-Cave. They would in no way interfere with present underground structures such as subways, water lines, gas pipes, sewage and drainage conduits, or with electric cables for telephone, telegraph, lighting and power. They would leave streets free of the cumbersome structures necessary to carry elevated roads, and property damage to abutting business houses would be eliminated.

Science News Letter, September 27, 1947

IN SCIENCE

INVENTION

Sewing Machine Operates On Different Principle

➤ A CHAIN-STITCH sewing machine that operates on a new principle is covered by U.S. patent 2,426,636, just granted to the late Thomas E. Monroe of New York, represented by his executor, William R. Donaldson. It uses two threads in sewing its seam, with both spools placed on spindles at diverging angles under the fabric table, about where the bobbin operates in a lock-stitch machine.

The needle has no eye and is never threaded. Instead, it is a pointed hook, that picks up first one thread, then the other, as they are shifted back and forth on an oscillating carrier with each stitch, thus drawing each through the loop just formed by its companion and making a continuous, well-locked chain.

The arm of the machine is not horizontal but slopes upward from the base at about a 45-degree angle. Within it is housed the small motor that supplies the operating power.

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MEDICINE

New Grants for Teaching And Research in Medicine

➤ NEW encouragement for beginning teachers and researchers in medical science is offered in grants announced by the John and Mary R. Markle Foundation in New York.

The grants, offering financial assistance for a period up to five years, are designed to fill a gap in scholarships and grants between the student and the successful scientist. A survey by the foundation showed that student scholarships and grants to famous scientists who have made names are available but there is little aid for the scientist starting a career in academic medicine.

Grants will be made under the new program to "scholars in medicine," young scientists who are qualified for medical faculties and for conducting research. The scholars-in-medicine program will begin in the 1948-49 school year. Each grant to a school will be for \$25,000 for five years, with an estimated 50 scholars to be aided by \$1,250,000 in five years.

Science News Letter, September 27, 1947

E FIELDS

PHOTOGRAPHY

New Machine Reproduces Drawings at Mimeo Speed

➤ PHOTO-REPRODUCTIONS of text or drawings at mimeograph speed are the revolutionary promise of a new duplicating method on which U. S. patent 2,427,443 has just been issued in Washington to Theodore R. Cochran of Glen Ellyn, Ill.

Key to the method is the peculiar photosensitivity of a series of organic compounds of tungsten, molybdenum and related metals. Irradiated with light just on the borderline between high violet and near ultraviolet, these compounds turn dark without further treatment of any kind; yet they are inert to ordinary daylight and lamplight.

In a preferred form of his duplicator, a transparent or translucent negative or master copy is secured to the rotating drum of a mimeograph-like machine. At the bottom of the turn, it passes under a bar-lens, behind which is a tubular mercury-vapor lamp. An automatic paper feed passes under it, on each turn, a sheet of paper coated or impregnated with the photosensitive metal salt. The image appears at once, and is permanent.

Rights in the patent are assigned to the A. B. Dick Company, pioneer manufacturers of mimeograph equipment.

Science News Letter, September 27, 1947

PHYSICS

Radar May Detect Cosmic Ray Bursts

➤ RADAR may have a new job helping unlock secrets of the universe hidden in the mysterious cosmic rays which bombard our atmosphere from outer space.

British scientists are launching experiments using sensitive radar in an effort to detect electrical bursts from very energetic cosmic rays. The experiments were revealed to the British Association for the Advancement of Science by Sir Edward Appleton, secretary of the British Department of Scientific and Industrial Research.

First efforts to track cosmic rays with radar will be made at the University of Manchester, under Dr. A. C. B.

Lovell, who recently reported the discovery with radar of a daytime meteor shower. The new attack on cosmic rays is planned as an extension of the meteor discoveries with radar.

Bursts of electrically charged particles, called ions, in the earth's atmosphere are caused by some of the powerful cosmic rays from outer space. The English scientists hope to be able to spot radio reflections from these bursts with their radar equipment. More sensitive radar equipment than was used to detect the daylight meteor showers will be used in the cosmic ray experiments.

Dr. Lovell told the British Association meeting that the three-month shower of meteors which was discovered with radar was unique in both intensity and duration compared with "shooting star" displays which have been seen with human eyes.

The showers came during daylight when both visual observation and photographic methods would not have found the meteors. But radio echoes bounced off the objects and were detected. This method may give scientists a new tool for studying cosmic rays.

Science News Letter, September 27, 1947

MATHEMATICS

Figure Center of West Established at Los Angeles

➤ HOLLYWOOD is famous for its figures, but the figure center of the West is going to be established at the University of California at Los Angeles.

The new figure center is not going to deal with the curve-lined figures of Hollywood, though. The figures will be mathematical, and the National Bureau of Standards' new Institute of Numerical Analysis will feature high-speed electronic calculators instead of high-powered press agents.

A giant electronic computing machine under development at the Bureau of Standards in Washington will be installed at the Institute to solve in minutes problems which now require days of computing.

The new Institute will do both research on electronic computers and actual computations for industries, research institutions and government agencies in the West. An announcement from the Bureau of Standards in Washington reported that the site was chosen because of the concentration of aircraft industries and presence of several major scientific institutions in that area.

Science News Letter, September 27, 1947

CHEMISTRY

Orange Dye Produced by Mold from Potato Family

➤ AN ORANGE dye that may find industrial use has been found in a fungus that causes a disease in plants of the potato family, *Fusarium solani*, by Prof. F. F. Noid, S. Weiss and J. V. Fiore of Fordham University. The pigment is purple as it occurs in the mold and the crude extract, but when purified and made slightly acid it turns orange. It has been given the name *Fusarium solani* D₃, they reported before the American Chemical Society in New York.

The pigment also seems to have antibiotic, or penicillin-like, properties for it has been found able to inhibit the growth of another, related fungus, *Fusarium lini*, which is the cause of the extremely destructive plant disease known as flax wilt.

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CHEMISTRY

Concentrated-Acid Process Changes Cellulose to Sugar

➤ SUGAR can be made from cottonseed hulls, peanut shells, ground cornstalks, wood flour and other cellulosic materials by a new and more economical acid-conversion process on which U.S. patent 2,426,677 has just been granted to Prof. Ellis I. Fulmer of Iowa State College, Ames, Iowa; Dr. John W. Dunning of Abilene, Texas, and Ralph H. Fash of Fort Worth, Texas.

One difficulty in some previous acid-conversion processes was that the re-concentration of acids diluted in changing cellulose into sugar cost so much that it ate up all possible profits. The new process gets around that difficulty by using exactly measured quantities of concentrated acid (preferably sulfuric) and mixing it so intimately with the finely-ground cellulose under pressure that there is no need for an acid-reclaiming stage at the end.

The cellulosic raw material must be as nearly water-free as practicable at the outset, the inventors warn, in order to prevent the heat of mixing water with concentrated acid from changing the higher sugars to glucose or other monosaccharides, which are less valuable. Supplementary water-cooling during the subsequent digestion of the acidified pulp, after dilution with water, may be desirable.

Rights in the patent have been assigned to Anderson, Clayton and Company, of Houston, Texas.

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ASTRONOMY

Water Animals in Sky

Whale and three fish appearing in southern evening sky. Pegasus also visible. October nights are not favorable for seeing planets.

By JAMES STOKLEY

►FOUR AQUATIC animals—a whale and three fish—are among the constellations now visible in the southern evening sky! Of course, one must not expect to see accurate pictures of these creatures on looking heavenwards this evening, for as readers of this series must now realize there is generally no resemblance between the figures the stars make in the sky and the objects after which the groups are named. But if we associate these areas of the sky with the names, and think of them as regions dedicated to the various objects, rather than as realistic pictures of them, it may be an aid in finding our way among the stars.

The two accompanying maps depict their arrangement, as viewed Oct 1 at 10:00 p.m. (your own variety of standard time), an hour earlier in the middle of the month and two hours earlier at the end. There, high in the south, is indicated a square of stars—the “great square” which forms part of Pegasus, the winged horse. Just below the square are shown four stars which form one of the two fish in the constellation of Pisces. The line of stars running from these to the east to the point of a V was shown on the old star maps as a string tying the two fish together. The other is represented by the star at the upper left-hand part of the V.

Head of Whale to East

Directly below the V is the figure of Cetus, the whale, of which the head is to the east, while the body is the larger group at the western end of the stars so connected. Lower in the sky, directly south on the map, is Piscis Austrinus, the southern fish. In this shines the first magnitude star called Fomalhaut. Just above it is Aquarius, the water carrier, represented of old as a bearded man carrying a jar from which water flows to—of all places!—the mouth of the fish.

Next to Aquarius, to the west, is Capricornus, a rather faint constellation representing an animal half goat

and half fish, so here we have still more water represented. It is rather curious to find this part of the sky so wet. One reason that has been suggested is that in ancient times, when the constellations were named, the sun passed through this part of the sky in the rainy season.

For the brightest star visible these October evenings, look toward the west, for the constellation of Lyra, the lyre, in which the star Vega shines. Directly above it is Cygnus, the swan, some of the stars of which form a large cross, with first magnitude Deneb as the star at the top. A little farther south is Aquila, the eagle, marked by another brilliant orb—Altair.

Other Bright Stars

Two more stars of the first magnitude are seen in the northeast. One is Capella, of Auriga, the charioteer, the other is Aldebaran, of Taurus, the bull. Later tonight, and in the early evening during winter months, these groups will hang high overhead, while the lyre and its neighbors will then have passed out of sight below the horizon.

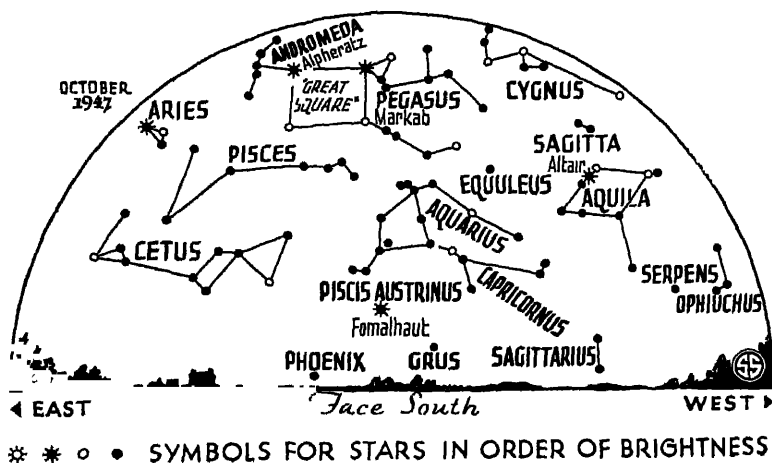
These October evenings are not favorable for seeing planets. Jupiter is low in the southwest at sunset, and sets an hour later. Soon after midnight the red planet Mars, now of the first magnitude, rises in the east, in Cancer, the crab. It is followed, in about an hour, by

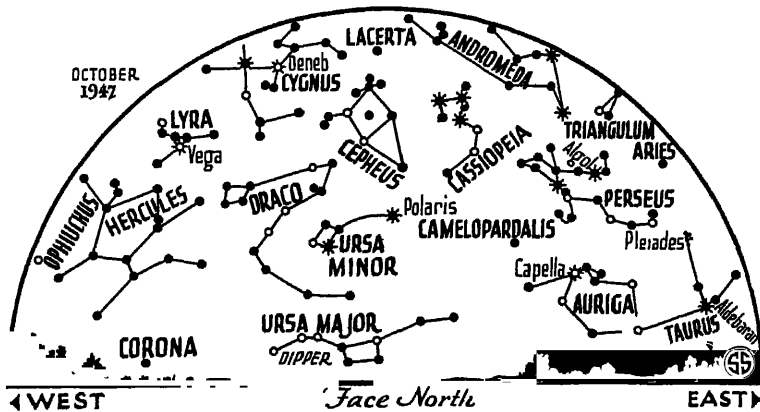
Saturn, still brighter, in Leo, the lion. Mercury and Venus this month are so nearly in the direction of the sun that they are hidden in its glare.

October brings us to the beginning of the year's last quarter. In a few months 1948 will be here, and we will perform the annual rite of taking down the old calendar and putting up a new one, as we shall at the beginning of 1949 and again of 1950. But perhaps that will be the last time we will do it. If a bill that was proposed with support from both parties in the last session of Congress passes, 1950 will mark the inauguration of a new and permanent calendar, the so-called “World Calendar.” If it is adopted, every year and every quarter of the year, will start on a Sunday. Each quarter will have 91 days in it. The first month of each quarter (January, April, July and October) would have 31 days, and all the rest 30. The reason for starting in 1950 is that in that year our present calendar happens also to begin on Sunday, so the two would gear smoothly together. Not until 1956 will the two calendars again coincide at the start of the year.

Product of Evolution

Though our present calendar seems pretty well established by usage, it is a product of evolution. The Egyptian calendar, established in 4236 B. C., and based on a very accurate determination of the relation of the earth to the sun, had a year of 365 days, divided into three seasons, each of four months of





30 days. This left five days over, which were celebrated as feast days at the end of the year. Then came Julius Caesar who, with the help of the astronomer Sosigenes, obtained the value of $365\frac{1}{4}$ days for the length of the year. To take care of the fraction, he introduced the leap year, with an extra day every fourth year, when four quarters had accumulated. He arranged the months approximately as they are today.

The Egyptians had a week of ten days, and so did the Greeks, while the Romans had an eight-day week. Then the Emperor Constantine introduced the seven-day week, and it has come down to us from him.

Origin of Leap Year

The year is actually a little less than $365\frac{1}{4}$ day long, so by 1582 the Julian calendar had run ahead. Eventually this would have brought religious festivals in the wrong season. With the advice of the astronomer, Lilius, and the mathematician, Clavius, Pope Gregory XIII ordered a new calendar, to take effect in October, 1582. To bring it back into step, ten days were dropped completely, October 4 being followed by October 15. Then to keep it in step three leap years were dropped every four centuries. That is, every year divisible by four is a leap year, unless it marks the close of a century, like 1800 or 1900. Then it is a leap year only if divisible by 400. Thus, 1700, 1800 and 1900 were not leap years, but 2000 will be, like 1600. Non-Catholic countries did not follow this right away. England, for example, adopted it in 1572, when 11 days had to be dropped, which resulted in riots in the streets of London. This, the Gregorian calendar, is the one we still use.

In regard to leap years, the World Calendar follows the Gregorian rule. The chief difference is the introduction

of a kind of a day that we do not have at present, one which is not part of any week. If the year were exactly 364 days long, it would be very simple, for that would be exactly 52 weeks. However, it actually is 52 weeks, plus a day and slightly less than a quarter. So the World Calendar has, in ordinary years, its 52 weeks, ending on Saturday, Dec. 30. The next day is Dec. W, the year-end World Holiday, which might also mark the celebration of the new year. The next day thereafter is Sunday, Jan. 1. In leap years a similar extra day, June W, comes between Saturday, June 30, and Sunday, July 1.

Many religious organizations have expressed a favorable view toward the World Calendar, and it has been endorsed by a number of commercial groups, who see the great convenience of getting away from the wandering holidays, the varying quarters and other defects from which our calendar now suffers. Perhaps, in a few years, we will have another change of calendar, and this time it may be one that will remain for a long time to come.

Time Table for October

Oct.	EST.	
7	5:29 a. m.	Moon in last quarter
8	3:36 p. m.	Moon passes Mars
9	1:00 p. m.	Moon nearest; distance 229,100 miles
	4:48 p. m.	Moon passes Saturn
14	1:10 a. m.	New moon
16	1:01 a. m.	Algol (variable star in Perseus) at minimum
	11:41 p. m.	Moon passes Jupiter
18	9:50 p. m.	Algol at minimum
21	6:39 p. m.	Algol at minimum
	8 11 p. m.	Moon in first quarter
	10:00 p. m.	Moon farthest; distance 251,200 miles
24	3:27 p. m.	Algol at minimum
29	3:07 p. m.	Full moon
Subtract one hour for CST, two hours for MST, and three for PST.		

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Benjamin Franklin, statesman and scientist, proposed a *universal* religion.

African *chameleons* have tongues longer than their bodies.

AERONAUTICS

Light Amphibian Plane Ideal for Sportsmen

➤ WITH a boat-shaped body and a retractable wheel landing gear, a new small plane of the Goodyear Aircraft Corporation can light on water or earth. The first of these amphibians is now undergoing exhaustive field and flight tests.

This three-place plane, called ideal for sportsmen, has two forward seats and one to the rear. It also has a baggage compartment of 11 cubic feet capacity. Powered by an 145-horsepower Franklin engine, it has a cruising speed of 110 miles an hour, and a range of about 370 miles. It is 26 feet in length and has a wingspan of 36 feet.

Pilot and passenger, well raised in the boat-shaped fuselage, have a clear view to the front and sides at all times. The wings are to the rear and placed high on the fuselage. The engine, and the pusher propellers operated by it, are in a superstructure above the wings. Well to the right and to the left, under the wings, are floats to insure safe landings on water. A retractable wheel in the tail assists the forward landing gear when alighting on an ordinary airstrip.

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Do You Know?

Farm ponds, built for stock water supply, irrigation, flood control, or ice, can produce fish if certain conditions are met.

ANTU, particularly effective in killing American *rats* of the common Norway type, causes their death from drowning in their own body fluids which accumulate in the pleural cavities around the lungs, it is claimed.

The American *turkey* crop this year is expected to be 15% to 20% less than in 1946.

An American helicopter, especially fitted for distributing *insecticides*, recently spread eight tons of DDT dust over the entire surface of Visingsö island, Sweden, in two days.

Maine alone contributed 17% of last year's total American *potato crop*.

In applying *paint* with a spray gun the air pressure used must be watched; excessive pressure will cause the paint to fog.

BIOCHEMISTRY

Oxygen Related to Cancer

Slowing down of oxidation process believed connected with cancer growth. Enzyme which promotes oxidation lacking in cancer tissue.

➤ CANCERS in the body may be like half-stifed slums in a city, where people sicken and go wrong for lack of enough clean air to breathe, for inability to utilize properly the food they get.

This Dickensian picture is conjured up by a technical paper on the enzyme chemistry of cancer, presented before the meeting of the American Chemical Society in New York by Dr. Van R. Potter of the University of Wisconsin, recipient of the Paul Lewis Award in enzyme chemistry.

The anarchic, mob-like piling up of cells that has long been recognized as perhaps the outstanding feature of cancer growth seems to be tied up with a slowing-down of the oxidative process that in normal cells burns up, as work or

other form of energy expenditure, possible growth-materials brought to them by the blood. Stated otherwise, as long as cells have free use of oxygen, including a normal supply of the enzymes or body-catalysts that promote oxidation, they burn up food supplies and remain normal. When absence of the necessary enzymes slows down the vital fires, the unburned food materials are accumulated and abnormal growth takes place.

Dr. Potter announced, among other new results of research in his laboratory, discovery of the absence or deficiency, in cancerous tissue, of an enzyme that in normal tissue promotes the burning up of oxalacetic acid, which might be called one of the half-consumed cinders of the body's fires.

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MEDICINE

Rocking Bed Used for Polio

Intended for patients whose breathing muscles are paralyzed, may replace iron lung in many cases. Aids circulation of blood.

➤ A NEW kind of bed may take the place of the iron lung for treatment of many infantile paralysis patients in the future. It was briefly mentioned by Miss Lucille Daniels, director of physical therapy at Stanford University, at the polio conference held in Warm Springs to commemorate the twentieth anniversary of the Georgia Warm Springs Foundation. Dr. Jessie Wright of Stanford will report on it in more detail later.

The bed is a rocking bed. By means of cranks, sections of the bed may be raised under the patient's knees and back to give a comfortable formfit. But the bed itself automatically rocks up and down, from head to foot. The speed can be regulated according to the doctor's prescription.

The bed is intended for polio patients whose breathing muscles are paralyzed.

Iron lungs keep them breathing by forcing air in and out of their lungs

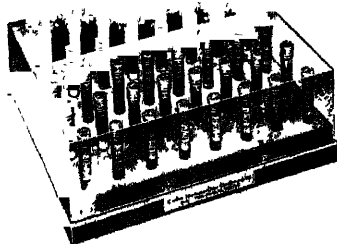
by pressure. The rocking bed does this by gravity. As the head is rocked down, the weight of the internal organs presses the diaphragm up to force air out of the lungs. As the bed rocks to the foot, gravity swings the organs and diaphragm back in the opposite direction and air is sucked into the lungs.

Besides helping the patient breathe, the rocking bed helps keep his blood circulating. This is important for nourishing the paralyzed muscles. The rocking also helps eliminate body wastes and prevents calcium salts from being deposited in the bladder.

Hot packs, baths and food can be given while the bed rocks. This gives it an advantage over the iron lung. Physical therapy treatments to stretch and exercise weakened muscles can also be given while the bed rocks. These important treatments are very much limited, except for small children, when the patient is in an iron lung.

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Diagnosis of infantile paralysis, like that of diabetes, may be aided by a sugar test. The test is not a sure test for polio as it is for diabetes, but it helps to distinguish polio from tuberculous meningitis and certain fungus infections which in the first few days may closely resemble polio.

MEDICINE

Will Try Cancer Serum

Three patients in U. S. will be treated with extract like that made in Russia and called KR serum. Is in experimental stage.

➤ THREE cancer patients in the United States will be treated about the end of October with an American-made anti-cancer extract like that made in Russia and popularly known as the KR anti-cancer serum. This was announced at the International Cancer Congress.

The material for treatment was made from germs of deadly South American Chagas' disease according to the Russian prescription by Dr. William M. Malisoff of New York. Dr. Malisoff is a Ph D., and the treatment will be given by physicians. Qualified scientists and physicians representing the American Cancer Society and other agencies have been invited to observe the work.

The patients to be treated have already been selected. The supply of KR extract is so small and present production so slight that "there is no likelihood of our working on other cases for a long time to come," Dr. Malisoff declared.

The treatment is experimental and it is possible that it will turn out absolutely worthless to humans.

In Moscow, 10 patients have been successfully treated with the original material made by Drs. Gregory Roskin and Nina Klyueva, his wife. But no cures are yet claimed by these scientists. The longest time any of these patients has gone without relapse or recurrence of cancer is two and one-half years. Five years freedom from cancer is the accepted standard for a "cure."

Mice have been treated successfully with the made-in-America extract, Dr. Malisoff reported. He has been making the extract since May of this year and using it on mice since June.

He said it is not true that he has treated any patient so far. He believes it impossible for any patient in the United States to have been treated with

The sugar test for polio is made on the spinal fluid. The quantity of sugar in this fluid may give the first lead to distinguish polio from other ailments with similar early symptoms, Dr. W. McD. Hammon of the University of California reported.

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the Russian material. This is because it does not keep and must be made fresh every day. This also is an important factor limiting production of large quantities.

Bottleneck in production and difficulty in ridding the material of poisonous substances have been encountered by Dr. Theodore Hauschka of Philadelphia, who has been working on the problem for two years. Dr. Hauschka has been using the same strain of germs as that used by the Russian scientists. Dr. Malisoff used a different strain and slightly different methods of preparing the extract. These facts may or may not explain the differences in results on mice obtained by the two scientists.

Both Drs. Hauschka and Malisoff and other cancer experts agree that further work must be done to find just what the extract will or will not do for cancer patients.

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METEOROLOGY

New Precipitation Cycle Charted by Scientist

➤ A PRECIPITATION cycle covering slightly less than a week has been discovered by Dr. C. G. Abbot, research associate at the Smithsonian Institution, Washington, D. C.

Dr. Abbot, who has previously reported a similar cycle for the radiation output of the sun, said the precipitation cycle is related in some unknown way to the solar radiation cycle of 6.6456 days.

He also reported a relationship between temperature cycles and solar radiation. Both temperature and precipitation lag behind the changes in solar radiation at the same times, Dr. Abbot found.

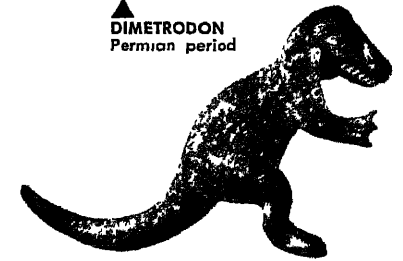
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PREHISTORIC ANIMALS

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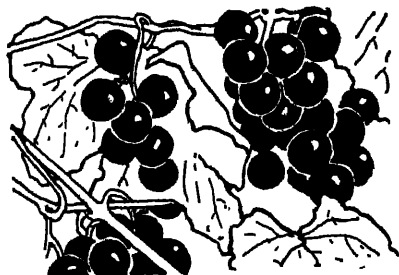
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Friendly Natives

➤ **VIKINGS**, sailing along the New England coast one pleasant autumn about a thousand years ago, made a landing and found quantities of good wild grapes. They named the country Vin-

land, as it is written in the saga of Leif the Lucky.

Who knows whether the Norsemen would have attempted their later colonization if there had not been this natural abundance of the means for making was-sail? Certain it is that the Pilgrims, some half-a-dozen centuries later, appreciated those wild grapes, for mention is made in the account of the first Thanksgiving feast of plenty of wine—which certainly didn't come over in the Mayflower, overloaded as that poor little ship was with ancestors and antiques.

The grapes of Vinland are with us still. They are the species called fox grape or even the skunk grape because of their musky odor; to botanists they are *Vitis labrusca*. From this northeastern wild grape are descended practically all of the present-day cultivated grapes of eastern North America; Concord and Catawba are among their earliest offspring.

Farther south, definitely belonging to Dixie, is another very tasty wild grape, the muscadine or bullace grape, with its much larger, thick-skinned berries in smaller clusters. Botanists know it as *V. rotundifolia*. Its most notable culti-

vated descendant is the famous Scupper-nong.

There are half-a-dozen more wild grape species in the northeastern quarter of this country, but they do not figure importantly in the ancestry of cultivated kinds. The first two species have won all the honors for pedigree.

America seems to be pretty much world headquarters for grapes. Of the 35 or 36 wild grape species in the world, as recognized by Bailey's *Cyclopedia of Horticulture*, 22 are American. Most of the rest are Chinese.

Oldest of cultivated grapes, however, and farthest-travelled, is the ancient Roman wine grape, *V. vinifera*. It was carried by the legions wherever they went, and when there were no more legions under the eagles, men who marched under the Cross carried it farther still. Although California has wild grapes of its own, the grape-growing and wine-making industry of that state was founded by the *padres* on this immigrant species, whose original home is believed to have been Syria. But it is the only intruder that has been able to make headway against the competition of our native American grapes.

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A STORY FOR DIABETICS

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MEDICINE

Mothers' Deaths Prevented

Blood tests before childbirth and measurement of blood loss, with blood bank on delivery floor urged to save maternal lives.

➤ **MOTHERS** need not bleed to death when their babies are born if proper care and preventive measures are observed, declares Dr. John Totterdale Cole of New York. (*Journal, American Medical Association*, Sept. 20)

Hemorrhage is a great menace to women today, outranking all other single causes of maternal death in the United States, he says.

Dr. Cole, who is on the staffs of Cornell University Medical College and the New York Hospital, presents a plan of treatment successfully practiced by the Women's Clinic of the New York Hospital.

He recommends a preliminary typing of the patient's blood to avoid delay in case an emergency arises. He also advises measurement and checking of blood loss.

"Absurd, yet impressive is the statement that hemorrhagic shock is caused by the loss of one drop of blood, and since

the physician does not know which drop, he should save every drop he can," he declares.

He also suggests that a small obstetric blood bank on the delivery floor would be useful. Dr. Cole, in emphasizing the importance of the time factor, urges rapid transfusions to replace at least 40% of the total blood loss during the first hour following hemorrhage.

In conjunction with the transfusion, the physician recommends the administration of an alkali to combat acidosis of shock, which may be a major factor in so-called irreversible shock by featuring in heart muscle and blood vessel damage.

Since the above measures were adopted at the Woman's Clinic there have been no deaths from hemorrhage during 3,600 major and 3,900 minor operations for women's diseases, and only one death due to hemorrhage in 14,000 deliveries.

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Books of the Week

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DIET AND PERSONALITY—L. Jean Bogert—*Garden City Pub Co*, 181 p., \$2.00 Popularly written book on nutrition which suggests how to adapt food and health habits to your type of physique and temperament.

EDUCATION IN EL SALVADOR—Cameron D Ebaugh—U. S. Office of Education, Bulletin 1947, No. 3—*Govt. Printing*, 81 p., paper, 25c. Another basic study on education which is one of a series prepared as a part of the program of cultural co-operation under the auspices of the U. S. Dept. of State.

HISTORICAL BACKGROUND OF THE PANAMA CANAL—Walter G. Ross—*W. G. Ross*, 114 p., paper \$1.00, cloth \$2.25. 1947 souvenir yearbook and directory of the Panama Canal Societies of the U S presenting a short history of the project.

HOME MECHANICS—William H. Johnson and Louis V. Newkirk—*Macmillan*, 302 p., illus., \$3.95. A useful book for teaching home mechanics to boys and girls, covering such subjects as electricity in the home, plumbing and heating, repairing of household articles, etc.

NEW FIELDS OF PSYCHIATRY—David M. Levy—*W. W. Norton* 171 p., \$2.75. Describing new functions of psychiatry ranging from child guidance to military government. Based on personal experiences of the author as revealed in his Salmon Lectures

ORNITHOLOGY LABORATORY NOTEBOOK—Arthur A. Allen—*Comstock*, 5th ed, 256 p., illus., \$4.00 Text for use in recording field observations and laboratory studies on birds of North America.

PRACTICAL DESCRIPTIVE GEOMETRY—S E Rusinoff—*Am. Tech. Soc.*, 259 p., illus., \$3.50. Principles of descriptive geometry presented for practical use in general engineering work, drafting room or shop

PSYCHOLOGY IN LIVING—Wendell White—*Macmillan*, rev. ed, 393 p., \$2.95. Psychological advice intended to help you get

along with people and find satisfaction for your basic needs.

A SIMPLE MICROMANOMETER—Jeanne E Brow and F. A. Schwartz—4 p., illus., paper. Free from *Mellon Institute*, Univ of Pittsburgh, Pittsburgh, Pa. Device for measuring very small pressure differences

SUBJECT GUIDE TO U. S. GOVERNMENT PUBLICATIONS—Herbert S. Hirshberg and Carl H. Melinat—*Am. Library Assn.*, 228 p., \$5.00. Books and pamphlets are listed by subjects for ready reference or informational use, covering material published during the past twenty years.

VASCULAR DISORDERS OF THE LIMBS—Thomas Lewis—*Macmillan*, 2nd ed, 118 p., \$2.25. Practical guide for students and practitioners on circulatory troubles, presenting new methods of testing and treatment.

WOOD WASTE IN THE UNITED STATES—U. S. Forest Service, Reappraisal Report #4—*Govt. Printing*, 45 p., paper, 25c. Nation-wide report analyzing waste so that better utilization may be made.

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ENGINEERING

Sonar System Used Synthetic Transducer

➤ THE BELL Telephone sonar system, one of those that got into active service during the war in detecting completely submerged German U-boats, was described to the American Institute of Electrical Engineers meeting in San Diego by A. C. Keller of Bell Laboratories, New York, where the equipment was designed. It used a synthetic material instead of quartz to convert electrical energy to underwater sound waves.

The equipment was constructed by Western Electric Company. A majority of the 996 enemy submarines sunk during World War II were detected and located by sonar, a short name for a Sound Navigation and Ranging system. In use it sends out underwater sound waves and picks up any returned by reflection from underwater obstacles. Also, it could pick up propeller and other noises from a submerged U-boat.

The sending and receiving equipment of the sonar system was placed under water in a dome low on the hull of a ship. Within it was a transducer, a crystal device which converts electrical energy into sound pressure waves. It also received returned sound waves and converted them into electrical energy to operate detection instruments on shipboard.

The transducer used in the equipment described makes use of a synthetic compound called ammonium dihydrogen phosphate. This is capable of handling high power at high efficiency, Mr. Keller stated.

For echo ranging, a short pulse of supersonic sound is transmitted into the water by the transducer as a highly directional beam. Then immediately the electrical system is transferred to a receiving condition to pick up returned signals. The time required for the pulse to travel to the submarine and return is a measure of the range.

The target range is indicated automatically by two types of visual indicators. One shows the range on a calibrated circular scale as a flash of light. The other is a cathode ray oscilloscope on which the range is indicated by the distance a spot has moved from its starting point. The oscilloscope is a part of a bearing deviation indicator. This unit greatly increased the effectiveness of sonar equipment, and indicated whether the target was to the right or left of the transducer bearing.

Science News Letter, September 27, 1947

A cement coating is applied by manufacturers to some nails; it gives extra holding power.

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⚙️ **NON-SPARKING** electric cable lessens danger of explosions in coal mines and other places where explosive dusts collect. It has a fine strand of copper wire embedded between the layers of insulation; this catches early leakage and conducts it to a circuit breaker which cuts off the power.

Science News Letter, September 27, 1947

⚙️ **COLLAPSIBLE** trailer for automobiles can carry a load of 400 pounds and when not in use is stored in the trunk of the car. It is a one-wheel affair, with rectangular aluminum frame that supports a canvas sling, the whole trailer weighing but 45 pounds.

Science News Letter, September 27, 1947

⚙️ **BABY BIB**, a novelty type held in place by ordinary straps, is made of rigid plastic molded to fit the body. It has a wide open trough-like receptacle at its base to catch spilled food, which can be used also to hold soup when spoon-feeding the child.

Science News Letter, September 27, 1947

⚙️ **CRAYON HOLDER** for the youngster who is apt to leave his coloring chalk around the floor has a mechanism that permits only one crayon to be removed at a time. A second can not be removed until the first is put back in place. It is a flat, eight-inch long, metal case.

Science News Letter, September 27, 1947



⚙️ **TINY "A" BATTERIES**, shown in the picture, for portable and personal radios, offer twice the listening hours of ordinary flashlight batteries, and are largely proof against swelling and leakage because surrounded by a steel jacket covering the basic zinc cell. The steel jacket keeps them from going stale in storage.

Science News Letter, September 27, 1947

⚙️ **CIGAR CAN**, within which 25 cigars are packed and sealed by a special vacuum process, preserves its contents with all the flavor, aroma and moisture of freshly made "smokes." The can is opened with the familiar key used to open cans of meats.

Science News Letter, September 27, 1947

⚙️ **ELECTRIC PLUG** for household appliances is made of a durable plastic and is easy to use. It is only necessary to bare the wires to be attached, twist the strands firmly, insert them into the plug, and turn a slot with a screwdriver or the edge of a coin.

Science News Letter, September 27, 1947

⚙️ **LUGGAGE CARRIER**, recently patented, permits cartage of a piece of lumber or a ladder on the side of the car. It is a triangular support with an open space at its top to hold the object, and a hooked extension that fits over the sill of the open window. Two would be needed for a ladder.

Science News Letter, September 27, 1947

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BIOLOGY

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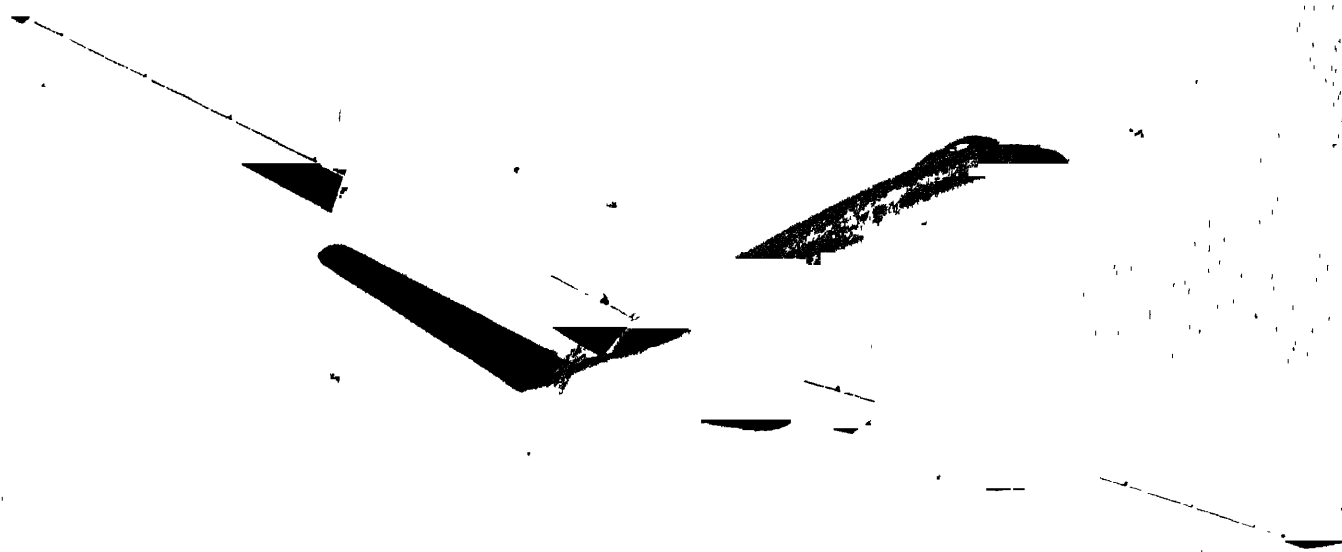


SCIENCE NEWS LETTER



Vol. 52, No. 14

THE WEEKLY SUMMARY OF CURRENT SCIENCE • OCT. 4, 1947



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A SCIENCE SERVICE PUBLICATION

MEDICINE

New Use Found For Pectin

Patients with such diseases as tuberculosis and diabetes may be helped by pectin's ability to prolong antibiotic and other drug action in the body.

► PATIENTS with tuberculosis, diabetes, other gland disorders and asthma may in future be helped by a discovery of Drs. Henry Welch, Harold L. Hirsh and S. Ross Taggart of the penicillin division, U.S. Food and Drug Administration and the District of Columbia Health Department.

Pectin, they found, can slow down the rate at which penicillin, streptomycin and other drugs escape from the body. This means fewer "shots" to disturb sick patients and greater economy in the use of the drugs.

The discovery that pectin can be used in this way was announced at the Washington meeting of the syphilis study section of the National Institute of Health.

Pectin is the fruit chemical housewives all over the country are counting on right now to stiffen the jellies they are making. Just before Pearl Harbor it was suggested as a substitute for blood to fight shock in war wounded. Its physical characteristics were considered enough like those of blood to make it suitable for replacing the fluid lost in hemorrhage, and it was found to be harmless when injected into human veins.

Dr. Welch and associates turned to pectin in a search for a chemical to keep penicillin in the body longer than a few hours. Oil and wax have been used with penicillin to slow the mold remedy's escape from the body. But these substances sometimes make the "shots" of penicillin painful, sometimes cause lumps and sterile abscesses, and sometimes lead to the patient's becoming sensitized to the drug so that he cannot take any more of it.

Pectin slows penicillin's escape from the body about the same as the oil and wax but, unlike these chemicals, it does not cause pain, abscesses or any of the other troublesome complications. It has been used in penicillin treatment of 350 patients without any unpleasant reactions.

Streptomycin's escape from the body is slowed even more effectively than penicillin's by use of pectin. The anti-
germ action of a one-half gram dose

can be maintained for two days (48 hours). At present, six times this amount of streptomycin must be used each day (24 hours) to treat TB patients. Cost of the drug is one limiting factor in its wider use. But if only a twelfth as much need be used, the cost can be reduced to an almost insignificant amount. Trial of streptomycin-in-pectin for tuberculosis treatment is about to start at Freedman's Hospital in Washington.

Drugs such as adrenalin and ephedrine which constrict small blood vessels also have their effect prolonged when they are combined with pectin. Study of pectin's effect on these drugs has so far been made only in laboratory animals, but they suggest great future benefit to asthma patients.

Sex hormones are now injected in oil

preparations. Insulin's action is slowed by giving it with protamine, a fish protein. Pectin might be used with advantage in place of the oil and the protamine, laboratory studies suggest. So far, the pectin-hormone combination has not been tried on patients.

The size of penicillin particles is important when the mold chemical is given in oil and wax, Drs. Welch and Hirsh have found in studies with Drs. Harry F. Dowling, Monroe J. Romansky, Jay A. Robinson, Velma L. Chandler and William W. Zeller of Gallinger Municipal Hospital and George Washington School of Medicine.

The original discovery that penicillin could be made more useful by giving it in oil and wax to prolong its stay in the body was made by Dr. Romansky while he was serving in the Army. At first it was thought that to use penicillin in this way, the mold chemical must be in a viscous or "solid" form. But if the penicillin particles are the proper size, the "liquid" form is just as good, Dr. Romansky and associates reported. They have devised a microscopic test for determining penicillin particle size.

Science News Letter, October 4, 1947

MEDICINE

Mayo-Like Center Founded

New Mexico foundation will have as its major interest expansion of the Lovelace clinic's cancer service and research in aviation medicine.

► A MEDICAL foundation supported by a medical clinic, like the famed Mayo Foundation and Clinic, has been established in Albuquerque, N. Mex. As a result, that city is expected to become the medical center of the Southwest.

One of the founders is Dr. W. Randolph Lovelace, II, surgeon famed for his high-altitude studies which included a 40,200-foot parachute jump to test the bail-out oxygen bottle for B-29's.

His uncles, Dr. William Randolph Lovelace, and Dr. Edgar T. Lassetter, are other founders of the new medical center. These two men 25 years ago founded the Lovelace Clinic. With their nephew, they have now given the physical assets of the clinic, valued at \$1,000,000, and its good will and name to the new foundation, which will be known as the Lovelace Foundation for Medical Education and Research. The clinic will operate henceforth as a voluntary association of salaried physicians under a

board of governors. Its income in excess of operating expenses will go to support the foundation.

Study of the apparent beneficial effects of Albuquerque's climate on arthritis, sinusitis and diseases of the chest, expansion of the clinic's cancer detection and treatment service, and research in aviation medicine will be major interests of the foundation.

A basic function of the foundation will be the awarding of fellowships enabling young doctors to take post-graduate training at the clinic in preparation for recognition as qualified specialists. The elder Dr. Lovelace is a member of the group that founded one of the organizations for certifying medical specialists, the American Board of Surgery. A trustee of the new foundation is dean of the University of Colorado Medical School, Dr. Ward Darling. President is Floyd B. Odum of New York and Indio, Calif.

Science News Letter, October 4, 1947

ELECTRONICS

New Atomic Tool Built

An electron linear accelerator, newest piece of atom-smashing equipment, built and operated at Stanford University, will lead to artificial source of cosmic rays.

➤ A SLENDER, three-foot atom-smasher may be the forerunner of a powerful new scientific instrument for producing artificial particles as potent as cosmic rays in the laboratory.

This new tool for probing the secrets of atoms is an electron linear accelerator, built and operated at the Stanford University Microwave Laboratory. A projected larger model of the accelerator, 100 to 200 feet long, could develop a billion electron volts, Dr. William W. Hansen, director of the laboratory, told the Institute of Radio Engineers. Sections of the smaller model were shown to scientists at the West Coast Electronic Manufacturers' Association trade show in San Francisco.

Electrons, the negatively-charged outer particles of atoms, "ride" through the pipe-like tube of the accelerator on microwaves. "The microwaves, invisible 'eyes' of radar, are generated by a million-watt magnetron in the new atom-smasher. Dr. Hansen, who played an important role in the development of radar, predicted that a billion-watt model of the accelerator will bring high voltage energy of the order of cosmic rays

into scientific laboratories for study.

Thus far, Dr. Hansen disclosed, the three-foot accelerator has produced electrons of more than 1,500,000 volts. The instrument was built at Stanford under contract with the Office of Naval Research.

Gold-plated disks inside the tube of the atom-smasher slow down the microwaves to the speed of the slower electrons. As the electrons travel through the tube, they pick up energy which increases their mass. At one point in its lightning journey, the tiny particle weighs 2,000 times as much as it does at rest.

This new attack on the tiny bits of atoms may unlock secrets of the fundamental particles of matter. High-energy cosmic rays, mysterious particles which bombard our atmosphere from outer space, are now studied high overhead in airplanes, balloons and V-2 rockets. An accelerator for producing energies equal to that of some of this cosmic bombardment might solve some of the mysteries of the rays which we neither see nor feel but which may affect us

Science News Letter, October 4, 1947



NEW ATOM SMASHER—Newest atom-smashing equipment in the United States, an electron linear accelerator, is being examined by its developer, Dr. William W. Hansen, director of the Stanford Microwave Laboratory.

of research along these lines, with the idea of eventually being able to track hurricanes and typhoons along their often erratic courses. The work is under the general direction of Capt. Howard T. Orville, chief of Naval Aerology. In addition to the six-station network in the Caribbean and Gulf areas, the Navy now has similar observatories on Guam and Okinawa, and is now setting one up at Sangley Point, on the island of Luzon in the Philippines.

Science News Letter, October 4, 1947

METEOROLOGY-SEISMOLOGY

Microseism Theory Tested

➤ THE Florida-Louisiana hurricane, because it was such a big one, gave Navy scientists an excellent chance to test out the relatively new microseismic method for tracking these tropical storms, from six observatories now in operation at Miami and Richmond, Fla., Corpus Christi, Texas, San Juan, P. R., Guantanamo, Cuba, and Swan Island in the Caribbean.

This method depends on the apparent association between big storms and tiny shiverings in the earth's crust that register themselves on seismographs, or earthquake-recording instruments. These tiny tremors, which have no known connection with the heavy shocks of true earthquakes, are known as microseisms.

A connection between microseisms and storms was vaguely noticed long

ago, it was suggested that pounding of storm-surf on the shore might cause them.

The theory was brought to a more definite focus a few years back by the Rev. James B. Macelwane, S.J., of St. Louis University, well-known researcher on earthquakes. His suggestion was that the tremors started, not on shore, but on the ocean bottom under the centers of tropical storms or hurricanes. Later he put forth the supplementary hypothesis that the mechanism that started the microseisms was a piling up of the ocean water, pushed toward the "eye" of the storm by the wide in-whirling wheel of the hurricane winds. This still remains to be proved or disproved.

The Aerological Section of the U. S. Navy has taken over the development Linlithgow Lib.

ASTRONOMY

German Discovers Faint New Comet in Heavens

➤ A NEW comet, visible only through powerful telescopes, has been discovered by a German astronomer, J. Reinmuth of Heidelberg, Germany.

The new thirteenth magnitude comet was moving north and west in the heavens when it was first discovered in the southern part of the constellation Pegasus, the winged horse. Reported to the Harvard College Observatory, Cambridge, Mass., by the European astronomical clearing house at Copenhagen, Denmark, the new discovery is called Comet Reinmuth, after the German astronomer who first spotted it.

Science News Letter, October 4, 1947

Popular "Panama" hats are made of toquilla straw from Ecuador.

MEDICINE

Oriental Blood Studied

Blood specimens of hundreds of children in three Oriental countries were collected for study of apparent immunity to poliomyelitis.

➤ WITH the blood specimens of several hundred children of three countries of the Orient, the fruit of a 28,000 mile air quest, a group of University of California scientists are preparing for studies which may answer one of the critical questions about poliomyelitis.

The blood specimens may show why there was an increased incidence of polio among American troops in Japan during the past polio season; and why, generally speaking, there is such an increase wherever Western European adults go into countries with poor sanitation, such as Japan, India and North Africa, without a parallel increase in the native population.

The specimens were collected by a scientific mission for the Army Epidemiological Board headed by Dr. W. McD. Hammon, University of California Medical School epidemiologist, and including Dr. J. Casals, of the Rockefeller Institute of Medical Research, Dr. Don M. Rees, University of Utah entomologist, and Dr. Gordon Meiklejohn, University of California.

Dr. Hammon says the specimens may reveal the accuracy of a medical theory which attempts to explain such an increase. This theory is that in countries with poor sanitation polio is a common ailment before the age of two, but paralysis is rare up to that age. With immunity presumably acquired by age two, there is a limited number of susceptibles to polio in the age group when the disease is likely to take the paralytic form.

In countries with improved sanitation, infants are better protected from the disease, but this results in a larger group susceptible to the paralytic form.

Dr. Hammon and his colleagues in the Hooper Foundation for Medical Research in San Francisco will study the blood specimens taken from children from six months to ten years of age in Japan, Okinawa, Korea and China to determine whether or not protective antibodies to polio are present.

If the antibodies are present immunity has been acquired. Blood of children of this age group in the United States does not show a high incidence of pro-

TECTIVE antibodies. If the incidence is high in the samples from the Orient, greater weight can be given to the hypothesis.

The scientists also collected large numbers of mosquitoes, carriers of Japanese "B" type encephalitis, and blood specimens of victims of this disease. Work with this material will be continued during the winter in Tokyo and the Hooper Foundation.

Another polio problem Dr. Hammon will study is a comparison of polio virus strains of the Orient and the U.S. Immunity to types found in the United States may not confer immunity to strains in the orient, he stated, and added that it is possible the increase in polio in the U.S. in the past two years may be due to the importation to this country of tropical strains.

Science News Letter, October 4, 1947

PHYSIOLOGY

Bone Grafts Actually Become Part of Body

➤ BONE GRAFTS actually live, developing their own blood supply and integrating themselves as a vital part of the body, from the time they are transplanted. Evidence for this comes from studies with radioactive phosphorus, one of the chemicals being produced in the atomic pile at Oak Ridge, Tenn. The bone graft studies were reported by Drs. Clifford L. Kiehn, Hymer L. Friedell and William J. MacIntyre of Western Reserve School of Medicine, Cleveland, at the American College of Surgeons.

Grafts from what is popularly called the hip bone, medically the iliac crest, were widely used during the war to replace jaws and other bones of the face that had been shot away. But there has been considerable controversy about whether these grafts lived immediately after transplantation or whether they died and new bone was later formed in their place.

To settle this point, the Cleveland doctors injected radioactive phosphorus which they could trace through the body to see where it was deposited in the bones. Phosphorus is one of the chem-

icals of which bones are made. In one study, they found that a bone graft from the hip, 24 hours after transplanting, had taken up radioactive phosphorus at about 60% of the amount taken up by the same weight of normal hip bone. Bone grafts that had been killed, or devitalized, by boiling, took up only 7% of the phosphorus as compared with normal bone.

Refrigerating bone grafts, as in bone banks, depresses the bone grafts for about a week, but after that the transplanted bone takes and lives satisfactorily.

Science News Letter, October 4, 1947

For matches a wood is required that combines straightness of grain, ease of splitting, ease of working, and toughness.

SCIENCE NEWS LETTER

Vol. 52 OCTOBER 4, 1947 No 14

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5 00 a year, two years, \$8 00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N. Y. C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439.

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AERONAUTICS

Fast Jet Bombers Tested

Two six-jet-engine Army bombers, built for high speed flying, have unusual thin wings to decrease air resistance. One is capable of over 480 miles an hour.

See Front Cover

➤ THE swept-back wings and other design features in the Army's newest jet-propelled bomber, now ready for ground and taxi tests at the Boeing Aircraft Co., in Seattle, Wash., follow the latest tested developments for speedy planes of the future.

This six-jet-engine bomber, the Army XB-47, or the Boeing Stratojet, is an experimental model to test the new in design. It is approximately the size of the B-29 Superfortress. The sharply swept-back wing and tail surfaces are ultra-thin to decrease air resistance at high speeds. Knife-blade leading edges on plane wing are conceded as essential on planes to fly at speeds approaching that of sound. Blunt leading edges develop heavy shock waves at transonic speeds which require much power to combat.

The six engines used in the Stratojet

were built by General Electric Company. They are carried under the wing surfaces, three on each wing. Two of the three are in a single housing close to the fuselage, the third is well out, relatively near the wing tip in an unusual position.

Another six-jet bomber for the Army under flight tests at the Glenn L. Martin plant near Baltimore is shown on the front cover of this week's SCIENCE NEWS LETTER. Its engines, also made by General Electric, are in banks of three under each wing. It is a long-range plane, capable of over 480 miles an hour, and can carry a bomb load of over ten tons. Its Army designation is the XB-48.

The Martin bomber has a wingspan of about 108 feet, and is 86 feet in overall length. The new Boeing bomber is 116 feet in wingspan and 108 feet in length. Both have thin wings to decrease air resistance, and both have landing wheels in tandem under the

fuselage, and light wheels for stability under the engine.

Science News Letter, October 4, 1947

BIOCHEMISTRY

New Anti-Germ Compound Found in Radish Seed

➤ RADISHES are responsible for the newest addition to the chemical family of antibiotics, or penicillin-like germ-checking substances. Drs. George Ivanovics and Stephan Horvath of the University of Szeged, Hungary, announce (*Nature*, Aug. 30) the discovery of an antibiotic compound in radish seed.

It will not be useful in medicine, in its present form at least, because experiments have shown it to be poisonous to animals. It has also been found highly active in preventing the germination of seeds of various kinds of plants, including cabbage and mustard, which are relatives of the radish, as well as members of the cucumber and grass families.

Because the generic name of the radish is *Raphanus*, the new antibiotic has been named raphanin.

Science News Letter, October 4, 1947

METEOROLOGY

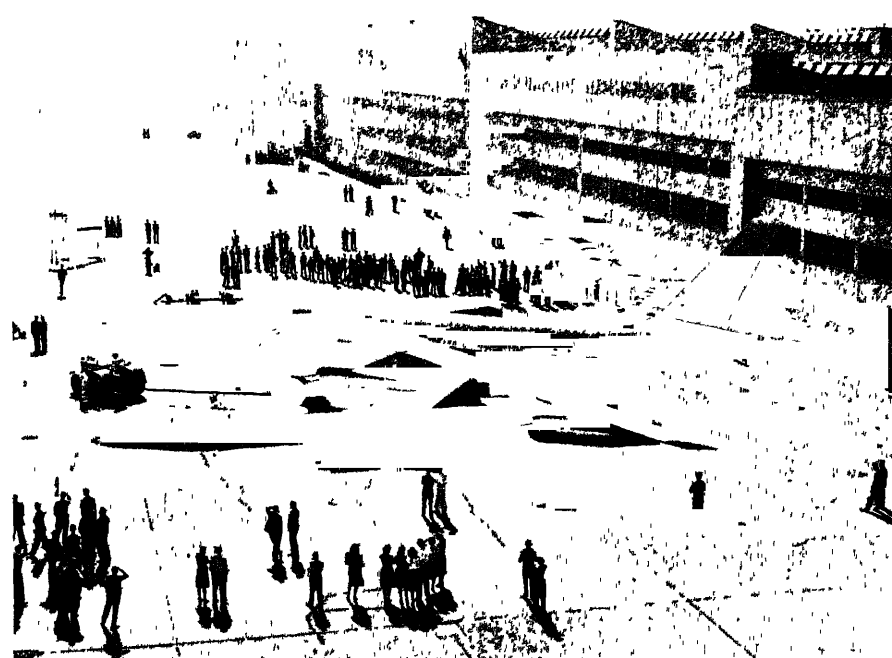
Cloud-Height Record Made Continuously at Airports

➤ A CONTINUOUS cloud-height record at over 42 Naval airports is now made automatically by a new photoelectric instrument developed by the Navy in cooperation with General Electric Co.

The instrument, called a ceilometer, measures the cloud ceilings over the airfield up to 10,000 feet by means of a reflected beam of light. It is an improvement over earlier similar methods in that it makes use of a modulated beam of light from a 25,000,000 candle-power projector which, being on special wavelengths, can be identified by receiving instruments. Another advantage is that it can be used in the daytime.

The apparatus obtains the height of a cloud ceiling from the ground by triangulation. The beam sent from the projector, after reflection from the base of the cloud, is received by the photoelectric detector which is at a known distance from the projector. An electric signal corresponding to the reflected light signal, and the angle at which it enters the detector, is transmitted to the airport recording machine.

Science News Letter, October 4, 1947



"STRATOJET"—This is the new experimental Boeing XB-47 with six jet engines. Notice the very thin swept back wings, which it is hoped will give the plane great speed, and the position of two of the jets near the wing tips.

GENERAL SCIENCE

Science Talent Search On

Scholarships totaling \$11,000 plus 40 all-expense trips to Washington to be awarded to outstanding high school seniors throughout the nation.

► RECRUITING for leadership in the army of scientists who have come to be America's greatest hope in peace and surest shield in war is actively under way again, with the formal announcement of the Seventh Annual Science Talent Search.

A Science Talent Search is a kind of academic hurdle-race—with each hurdle higher and harder to clear than the one before it.

To begin with, the contestant has to have a good school record behind him, for a full set of his grades, together with statements by his principal or the teachers who know most about him, go to the judges along with his examination papers and essay. While no student is barred from competing, as a practical matter only seniors who are well toward the tops of their classes are likely to qualify for the finals.

Each student must complete a three-hour science aptitude examination in his own school. This is designed primarily to demonstrate his ability to master new and unfamiliar matter, and to reason out correct conclusions from clearly stated though somewhat difficult facts, rather than to find out what he has already learned or memorized.

The contestant must submit an essay of about 1,000 words on "My Science Project." This is expected to be a report on a definite project in laboratory research or field study carried on independently by the student himself.

When the judges have these three things from each entrant—student record, aptitude examination, and essay—they begin the difficult task of sifting. From the approximately 16,000 entrants, a list of 300 Honorable Mentions is first selected. These are recommended to colleges, universities and technical schools for scholarship consideration.

Then the student's ability to work and think by himself, as evidenced by his essay on his research project, is brought into the picture, and becomes an important factor in the selection of the 40 finalists who win the all-expense five-day trips to Washington.

Arriving there about the end of February they will participate in a Science

Talent Institute, where they will meet leaders in American science and hear from them of newest research advances.

During their five days in Washington, the 40 finalists will be personally interviewed by a judging committee to determine their eligibility for the Westinghouse Science Scholarships which total \$11,000. One boy and one girl will each receive \$2,400 Westinghouse Grand Science Scholarships (\$600 per year for four years). Eight other contestants will receive four-year scholarships of \$400 each (\$100 per year for four years). Additional scholarships totalling \$3,000 may be awarded at the discretion of the judges, who are Dr. Harlow Shapley, Director, Harvard College Observatory; Dr. Harold A. Edgerton and Dr. Stuart Henderson Britt, New York City psychologists, and Dr. Rex E. Buxton, Washington psychiatrist. Drs. Edgerton and Britt are also the designers of the science aptitude examination.

Primary objectives of the Science Talent Search, as stated by Watson Davis, Director of Science Service, which administers the scholarship funds through Science Clubs of America, are:

1. "To discover and foster the education of boys and girls whose scientific skill, talent and ability indicate potential creative originality and warrant scholarships for their development.

2. "To focus the attention of large numbers of scientifically gifted youths on the need for perfecting scientific and research skill and knowledge so that they can increase their capacities for contributing to the rehabilitation of a war-dislocated world and to help the United States, with the aid of science, to lead the world to permanent peace.

3. "To help make the American public aware of the varied and vital role science plays in world affairs and in raising the standard of living."

Since 1942 a total of 240 young scientists have been named as winners of trips to the Science Talent Institute. Among this select group of 61 women and 179 men are 11 who have finished college and are now employed full time as chemists, engineers, neurobiologists, and

research assistants in industrial laboratories and as graduate assistants in colleges and universities.

Paralleling the national science talent search, there will also be a number of state science talent searches. In those states all students entering the national search are automatically entered also in the state search. Last year there were state science talent searches in Georgia, Louisiana, Illinois, Iowa, Tennessee and Virginia; this year there will probably be additions to the list. Winners of the state science talent searches are given recognitions of various kinds, including honorary memberships in State Academies and the American Association for the Advancement of Science, and such substantial awards as full-tuition scholarships in colleges and universities in the respective states.

Complete details of the Seventh Annual Science Talent Search can be obtained from Science Clubs of America, 1719 N St. N.W., Washington 6, D. C.

Science News Letter, October 4, 1947

GENERAL SCIENCE

Random Numbers System Devised for Indexing

► A NEW way of indexing scientific knowledge which increases many billion times the ability of a sorting card to carry and produce information was announced to the American Chemical Society meeting in New York by Calvin N. Mooers of the Zator Company, Cambridge, Mass.

Applying the mathematical principles of random numbers to this urgent problem of classifying facts of all sorts, the new Zato carding makes possible a new type of literature organization unhampered by any sort of pre-set classification.

Instead of having to devise a classification in advance that encompasses all future details, the random numbers system devised by Mr. Mooers builds its subject headings as needed and brings as many subjects as desired into mechanical relationship.

An individual scientist can use this method in arranging his research and literature notes, it was explained, or a large chemical concern can apply it to its library and information files.

"All sorts of information can be filed successfully in the same file," Mr. Mooers claimed. "The wife may even file her recipes and future social engagements in the same card file as her scientist-husband's chemical formulae without any conflict or mix-up whatever."

MEDICINE

Diabetes Is Widespread

Survey revealed that for every four known cases of diabetes, three more previously undetected and unsuspected were found.

➤ DIABETES probably afflicts many more persons in the United States than is generally believed. Over two million persons have the disease, if figures from the latest survey apply to the nation generally.

The survey was made in Oxford, Mass., by Drs. Hugh L. C. Wilkerson and Leo P. Krall, of the U.S. Public Health Service. (*Journal, American Medical Association*, Sept. 27.)

Of Oxford's 4,983 inhabitants, 3,516 were tested. A total of 70 cases of diabetes was found. On the basis of the total population of the town, the prevalence of diabetes would be 1.7%. In other words, 17 out of every 1,000 has the disease.

For every four known cases of diabetes, three more previously undetected and unsuspected were found through the survey.

Among the 70 diabetics, 31 were men and 39 women. The median age of the known diabetics was 59.5 years, that of the new cases 55 years.

In more than a third of the cases, there was a family history of the disease. Most of the 70 reported that they had been overweight at some time in their lives.

Many of the patients with newly discovered diabetes reported symptoms common to the disease but did not know the significance of the symptoms.

Less than half of the patients who knew they had diabetes were following diet and other measures sufficient to keep the disease under control.

Among the unsuspected cases discovered in the survey was a 55-year-old mill worker whose work efficiency was reduced because of sickness, weakness and occasional numbness and neuritic pains in his hands and feet. After a fainting spell at work he was given a physical examination but no test for sugar in his blood or urine. When these tests were made in the survey, his diabetes was discovered and he is now under treatment.

The importance of early diagnosis was shown by the case of a 16-year-old boy who had no previous complaints. His

grandmother, however, had died with diabetes. The survey tests showed that his blood sugar level barely reached the minimum for a diagnosis of diabetes. But because of the family history and the tests, he is considered a potential diabetic and is now under observation and dietary treatment by his family physician.

This may be the type of case in which early discovery and prompt treatment may prevent development of the disease. The American Diabetes Association is following the case with this in mind.

Science News Letter, October 4, 1947

TECHNOLOGY

Big Fans Protect Fruit Against Frost Damage

➤ GIANT fans, blowing in opposite directions from rotating tops of 32-foot steel towers, are replacing the long-used smudge pots to protect the fruit from frost in America's citrus growing areas. They protect by mixing the warmer air above trees with colder air beneath.

This device, according to *Steelways*, publication of the American Iron and Steel Institute, is now in use in lemon groves near Oxford, Calif. Lemons, it is said, require greater protection against frost than oranges. The fruit is maturing throughout the year, therefore there are always tender shoots and small lemons that must be kept from freezing.

This air-mixer, one of which will protect 20 acres, is composed of two light aluminum 12-foot propellers resembling those used on airplanes, and a gasoline engine centered on the top of the cylindrical tower, the shank of the device.

The self-starter for the engine is located near the base of the tower within easy reach of the ground so that the machine can be put in operation when desired merely by pushing a button as is done with the self-starter of an automobile. The entire top, engine and fans, rotates slowly in a horizontal plane so that the artificial wind is blown in all directions.

The scheme is somewhat similar to

one used by a Maryland apple grower recently to protect his orchard from freeze. However, he used two airplanes that passed forward and back just over the tree tops in the early hours preceding daylight. The current of air from the propellers was reported to have kept the orchard air well mixed.

The wind-creating device, costing about \$3,500 per set, is stated to be cheaper than the use of smudge pots whose principal cost is for fuel oil and labor. Also it eliminates a nuisance; it creates no sooty smudge to drift into neighborhood homes. The operating cost of the wind-creator is for the labor of one man long enough to start the engines, plus the gasoline for a few hours running.

Science News Letter, October 4, 1947

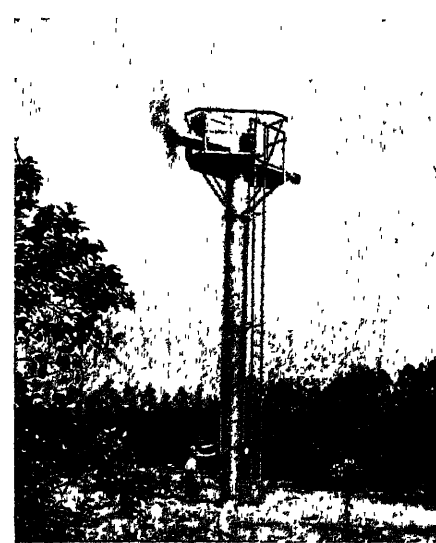
CHEMISTRY

\$1,000 Award Established For Iodine Research

➤ IODINE, familiar first aid remedy for cuts and an important body chemical, may have still undiscovered medical uses.

To encourage and reward further research in the chemistry and pharmacy of this chemical, a \$1,000 award has been established by the Iodine Educational Bureau of New York City. The award will be given every two years through a special awards committee of the American Pharmaceutical Association.

Science News Letter, October 4, 1947



FOR FROST PROTECTION—Giant fans such as this one are replacing smudge pots to protect the fruit from frost in America's citrus groves.

VETERINARY MEDICINE

Vaccines Found Useless For Mexican Cattle Disease

➤ EUROPEAN foot-and-mouth disease vaccines hold no hope for Mexico's afflicted cattle. The only possible remedy for the situation in that country is still total extermination and deep burial of all infected or exposed animals.

This is the verdict of Britain's foremost student of foot-and-mouth disease, Dr. I. A. Galloway of the special laboratory for the study of the malady set up at Pirbright, England.

Samples of virus from sick Mexican cattle were flown to Pirbright, and studied there in connection with the best of Europe's preventive vaccines. All were found ineffectual.

Dr. Galloway has just concluded a survey in Mexico in company with scientists from the U.S. Department of Agriculture and the Mexican Ministry of Agriculture. He has been attending a conference in Washington on the foot-and-mouth disease problems.

Science News Letter, October 4, 1947

BIOLOGY

No Inspection System Serves Against Germ War

➤ A SILENT and sinister Pearl Harbor on a nationwide basis could be created by biological or germ warfare, Dr. Robert W. King, assistant to the president of Bell Telephone Laboratories, declared in a report to the Eighth Conference on Science, Philosophy and Religion in Philadelphia.

"If a nation is bent upon waging biological warfare," he said, "there is no form of international inspection which would be worth the paper and ink used to formalize it. Biological research and preparation need only the barest minimum of raw materials, a small personnel and very isolated laboratories and plants."

If a crippling disease or poison can be effectively broadcast in an enemy state, he said, "the atomic bomb is already well along toward being outmoded as the weapon especially to be feared."

Dislodging by the United Nations of leaders of a nation from their positions of power was recommended by Dr. King as a war prevention measure when the leaders bring their nations to war's brink in opposition to a United Nations position.

Scientists must remain free to discuss their discoveries whether or not these touch closely upon secret military devices and developments, Dr. King declared. The freedom of science may hinge upon the creation of a world police with elimination of national military rivalries, he told the conference.

As a means of reducing the misunderstanding among pupils studying textbooks on both sides of the iron curtain, Dr. Robert H. Lowie, University of California professor of anthropology, advocated in a conference report that "a commission of British, Russian and American scholars might unite on a formulation of historical facts that would not cause umbrage in any of the countries in question."

Practical difficulties would confront such an attempt in the United States, Dr. Lowie recognized, as the matter of historical texts is one that is constantly liable to interference by mob rule.

Science News Letter, October 4, 1947

MEDICINE

Thirty or More Viruses Held to Blame for Polio

➤ THIRTY or more different infantile paralysis-causing viruses may exist, Dr. Robert Ward, New York University College of Medicine, pointed out at a conference on the disease held at Warm Springs, Ga.

The conference was held to commemorate the twentieth anniversary of the polio treatment center's founding by the late President Franklin D. Roosevelt.

The number of kinds of polio virus that exist is not known, Dr. Ward said. There may be as many types as there are pneumonia germs or streptococci. Pneumonia germ types number some 33, and before the sulfa drugs and penicillin, saving a patient's life often depended upon being able to give him serum of the exact type of pneumonia germ that had invaded his body.

Existence of more than one type of polio virus strain is one of the handicaps to preparing a vaccine against the disease. Another is the lack of tests for polio virus, similar to tests now available for detecting different types of pneumonia germs. To be effective, a vaccine would have to be capable of giving protection against all types of polio virus, since there is no way of knowing which type may have attacked.

"No such vaccine is available today," Dr. Ward declared.

Science News Letter, October 4, 1947

ORDNANCE

Surplus Army Bombs Being Buried to Preserve Them

➤ SURPLUS Army bombs are being buried "alive" to preserve them, the Department of the Army revealed in Washington. Stripped of bomb parts and shipping bands, the bomb body, filled with the explosive TNT, is buried under the earth in great piles.

Before burial, all paint scale, rust and dirt are removed from the bomb. Fuze cavities are filled with a preservative, and threaded parts are covered with bandages and grease. Then the entire bomb body is coated with a special preservative.

Following this preparation, the treated bombs are stacked in as small a space as possible and covered three feet or so with earth. After the earth covering has settled, it is further compacted and covered with a waterproof blacktop similar to that used on roads. The present experimental burying ground is in northwestern Illinois.

Science News Letter, October 4, 1947

MEDICINE

Fat from Blood May Be Weapon Against Disease

➤ A FAT from blood may become a chemical weapon of the future against encephalitis, infantile paralysis and other virus-caused diseases that attack the brain and nervous system. (*Science*, Sept. 19).

This possibility, and so far it is only a possibility, is now being investigated by Drs. J. Casals and Peter K. Olitsky of the Rockefeller Institute for Medical Research, New York.

The viruses of three kinds of encephalitis, popularly known as "sleeping sickness," are inactivated in the test tube by a fat from blood serum, the Rockefeller scientists discovered.

The fat, or fatty substance, has not yet been identified. It has been found in blood serum from mice, hamsters, rabbits and horses. Its chemical identity, the mechanism of its virus inactivation and the bearing of this on laboratory tests for viruses are now being investigated.

Science News Letter, October 4, 1947

ENGINEERING

Shortage of Engineers Predicted Until 1949-50

➤ ENGINEERS and scientists for American industry will continue to be in short supply well into 1949 or 1950, an industrial educator warned.

H. N. Muller, manager of the educational department of the Westinghouse Electric Corporation, Pittsburgh, declared, "All companies are short of technically trained men today.

"The competition for these men is keener than it ever was," he added.

Industrial expansion coupled with the wartime drain on schools and colleges is blamed for this postwar shortage by Mr. Muller.

Westinghouse, the official explained, is enrolling many more men in its graduate student training courses for new technical employees than it did before the war. Wages for these college graduates starting in industry are far above prewar levels, too, Mr. Muller pointed out.

Science News Letter, October 4, 1947

MEDICINE

Poison-Ivy Self-Treatment Nearly Fatal to Boy

➤ POISON-IVY tincture nearly killed a Philadelphia boy who used it without medical supervision in an attempt to make himself immune to the weed. The story (*Journal, American Medical Association, Sept. 13*) is told by Dr. Harry Lowenburg, Jr., of Philadelphia.

The patient was first seen in 1942 as a boy of 7. He had a distressing array of symptoms. He was treated for what seemed to ail him and showed some improvement, but continued to need treatment.

Finally in 1946 he was admitted to the Jewish Hospital with a high fever and severe gastro-intestinal symptoms including wine-colored vomit; breathing and circulation were quite abnormal. Various emergency treatments were given. His condition improved, and he was eventually discharged as cured.

When his parents were closely questioned, they told Dr. Lowenburg that for seven weeks their son had been swallowing daily doses of a commercial

tincture of poison ivy, stepping up the dose from five drops a day at the outset to 57 drops just before the crisis that sent him to the hospital. Maximum dosage for adults, as recommended by the manufacturer on the label, was five drops three times daily in half a glass of water. In his anxiety to become immune to poison ivy, he had overdosed himself to within an inch of his life.

And it all went for naught. Dr. Lowenburg adds that since his recovery, a little more than a year ago, the boy has had two severe attacks of ivy poisoning.

Science News Letter, October 4, 1947

PHYSICS

Scientists Probe Mystery Of Cosmic Particle Birth

➤ ONE of the mysteries of subatomic matter and energy concerns just how cosmic rays from outer space create very short-lived particles called mesons or mesotrons.

A new theory suggests scientists have been seeing only the start and the finish of the birth process, Dr. Victor F. Weisskopf of the Massachusetts Institute of Technology said in a letter to the *Physical Review*, (Sept. 15).

The whole process of producing a meson in the earth's upper atmosphere by a proton, which is a cosmic ray particle, happens very fast and the meson created lasts only a few small fractions of a second. But this time is sufficient, so Dr. Weisskopf surmises, for the proton to get into a state preparatory to meson production. This may explain why the production of a proton by a meson has not been discovered, as it should be if the process is simply reversible.

Science News Letter, October 4, 1947

PHYSICS

Five-Mile Phone Calls Carried on Light Beam

➤ A DEVICE for talking across one to five miles with a beam of light was disclosed in New Haven by three scientists. They said the "beam of light telephone," developed during World War II, could be used day or night. At night, infrared filters prevented the enemy from literally seeing the conversations.

The scientists are William W. Watson and Richard F. Humphreys of the Yale University Department of Physics and D. L. Woernley of the Cornell Aeronautical Laboratory, Buffalo, N. Y.

Science News Letter, October 4, 1947

CHEMISTRY

Tons of Mushrooms Wanted To Produce Antibiotic

➤ WANTED: mushrooms, at least two or three tons. Deliver to Miss Nancy Atkinson, Institute of Medical and Veterinary Science, Adelaide, South Australia.

Not that Miss Atkinson is that fond of mushrooms-on-toast. She has good scientific reason for wanting such a huge quantity. She has found in the common mushroom that you buy in tins or little baskets a penicillin-like drug which she states kills tuberculosis germs in a test-tube, and attacks a wider range of bacteria than penicillin itself.

Now she wants to make a sufficient quantity of her new antibiotic to try it on guinea-pigs infected with tuberculosis, and if they survive the treatment then possibly on volunteer TB patients.

The common market mushroom (*Psalliota* to botanists) was only one of more than 200 varieties of fleshy fungi in which Miss Atkinson found antibacterial activity.

Science News Letter, October 4, 1947

ASTRONOMY

"Flying Mountain" Found By California Astronomer

➤ A "FLYING Mountain" whirling through space at a speed of 14 miles per second has been discovered in the heavens.

The flying mountain is a new minor planet, less than 10 miles in diameter. It is millions of miles from the earth, so you will not be able to see it without a powerful telescope.

The newest-discovered minor planet, or asteroid, was spotted by C. A. Wirtanen, astronomer at the Lick Observatory, Mt. Hamilton, Calif. He found it last July as a trail on a 17-inch plate exposed in the 20-inch Carnegie astrographic telescope of the observatory.

Named Wirtanen's Object, the tiny new planet has the second closest orbit to the sun of any asteroid yet discovered. Wirtanen's Object circles the sun at a distance of 156,000,000 miles. The closest known orbit for an asteroid is that of Eros, 133,000,000 miles. The earth is 93,000,000 miles from the sun.

Like most of the more than 1,500 known asteroids, Wirtanen's Object has an orbit between Mars and Jupiter. Its closest approach to Mars is 6,000,000 miles.

Science News Letter, October 4, 1947

GENERAL SCIENCE

Youth Learns Science

High school students through the Science Clubs are cooperating with government agencies in such work as weather observation, tree study and laboratory testing.

By WATSON DAVIS

► IF YOU SEE a boy measuring the depth of water in a tin can after a very hard rain, he is a cooperator of the U. S. Weather Bureau.

If a high school girl is inspecting the trees in your neighborhood with an expert air, she is probably doing it for the U. S. Forest Service.

If a little group of young people in a basement laboratory produce unusual odors, they may be chemists of tomorrow.

These young scientists are representative of a third of a million members of Science Clubs of America who this fall are resuming hobby activities that fit in with their high school studies.

In more than 14,000 junior and senior high schools there are these science clubs, each with a couple of dozen members who have as their guide and sponsor a favorite science teacher.

In Your Region

There are such clubs in your locality. Science Service is cooperating with school officials and scientists throughout the nation in providing the information and know-how for science club organization and activities. Any teacher or interested adult who sponsors a science club can, without any cost whatever, affiliate it with the national Science Clubs of America and receive a hundred-page handbook full of data and aids to science hobby activities.

The young science enthusiasts have fun in carrying out their science projects. But what they do is very far from mere child's play.

Leading science organizations, in government, industry and elsewhere, cooperate in suggested projects. Many of the investigative tasks are of direct, practical benefit to the communities in which the science club members live.

Even FBI agents under J. Edgar Hoover have set up a scientific project in which any club can participate. A group can learn all about taking fingerprints, how to develop chemically latent

prints that can not be seen by the unaided eye, how to make up fingerprint cards that can be filed in the actual FBI files of civilian records. Secrets of examining questioned handwriting, detecting suspected paper, ink, typewriting and other markings are explained. The students of scientific criminal investigation are told how ultra-violet light is used in scientific police work. Testing of blood, firearms, identification of glass smashed in hit-and-run auto cases, and use of spectrographic methods are also included.

The cooperation of science club members by the thousands all over the nation in measurement of sudden and very heavy rainfall is used by the U. S. Weather Bureau in spotting the distribution of torrential rains that could not otherwise be recorded. Officials of the U. S. Weather Bureau have pronounced these observations an aid to future forecasting.

Human lives are saved by the studies that science club members make upon the cause and prevention of automobile accidents in cooperation with the traffic research specialists of the American Automobile Association. Young scientists test drivers to determine their driving skill, and fellow students are helped to avoid spills when they ride their bikes to and from school.

Planted Cork Oaks

Thousands of cork oak trees are now growing in the southern half of the country because science club members have aided in planting seeds and seedlings. In many instances, rare cork oak trees have been discovered growing naturally and protected so that in another national emergency our nation shall not lack this essential raw material.

One group of high school chemists became expert and advanced in complex organic syntheses. They actually set up a small business concern and manufactured in a basement laboratory in their spare time rare chemicals that were needed in the war and were being produced nowhere else.

New kinds of insects are discovered by high school entomologists and they have the privilege of giving them names that become a part of the scientific literature.

In several cases young science club archaeologists studying Indian mounds near their schools have had their scientific papers published in professional journals before they were graduated from high school.

Work Together

Often teams of scientists work up demonstrations in physics, chemistry and biology which are so effective that they take them on tour among the grade schools in the vicinity at the invitation of the teachers. Other clubs give spectacular science shows before the parent and teacher associations of their schools.

In almost every science club there is a young astronomer who is building his own telescope, a young physicist who has a radio set with which he talks to fellow "hams" in other lands, or a young mechanical engineer who is remodeling an old automobile to get better mileage or more speed out of it.

There are young chemists who know all that has been announced about atomic energy and who anticipate the next official releases with intelligent guesses. There are youngsters by the score who



YOUTHFUL ENGINEER — This Science Club member is preparing for the day when he may be designing engines for science and industry.



GEOLOGISTS IN MAKING—Young science club geologists are using microscopes to study minerals they are preparing for exhibit in a Science Fair.

are working hard on the problem that is bigger than atomic energy—the practical understanding of photo-synthesis or the way of capturing the sunshine so that it is used as stored energy.

Science Service cooperates with the science clubs by publishing the latest and most authentic news of science and club activities.

The professional scientists and teachers also do their bit to help this youth movement in science. State science academies, universities, colleges, teacher associations, museums and other organizations are cooperating.

State Science Fairs

State and regional science fairs or congresses for science club members are being held throughout the nation. The projects that are most noteworthy in the judgment of the schools are sent to these larger exhibitions where they often win scholarships and other prizes for the young scientists who did them.

Each year Science Clubs of America conducts the national Science Talent Search which culminates in the award of the Westinghouse Science Scholarships at the Science Talent Institute at Washington. This is a crowning activity of the science clubs and in many cases the seniors who participate have been working on their science hobbies during the whole six years of their junior and senior high school work.

Girls as well as boys are members of the science clubs. Most of the activities can be carried on as effectively by girls as by boys. In the Science Talent Search each year the proportion of girls who win honors is determined by the ratio of girls to boys who enter.

The science club activities of high school students have won approval from national and science leaders as a serious and important aid to the nation's science program.

America finished the war with a realization that there were not nearly enough scientists and development engineers available to discover new basic knowledge, do the necessary industrial and military research and train the oncoming scientific generation.

The report of the President's Scientific Research Board just issued recommends that by 1957 the nation should devote at least one per cent of our national income to research and development in the universities, industry and the government. This means that many thousands of scientists and engineers will be needed in addition to the number that will be trained in colleges and universities if the normal number of past years are produced.

Many of the science club members in the schools of the nation this fall are receiving their first contact with science and its possibilities. The extent to which they and their teachers develop science

club opportunities will determine to a large degree how well the urgent national need for scientists will be answered in the future.

For every club member who will become a professional scientist there are hundreds who will not. For most of the school science hobbyists, science will remain a hobby throughout life, whether they become lawyers, merchants, housewives or some other variety of the great public. For these non-professional scientists of tomorrow, the serious fun they have in science clubs is one of the richest experiences of their youth. They will be better equipped to live in a scientific world and control the results of science so that civilization will progress rather than be wiped out.

Anyone interested in science clubs can get information by writing to Science Service, 1719 N St. N.W., Washington 6, D. C.

Science News Letter, October 4, 1947

The Lincoln soybean, an American cross between Mandarin and Manchou, is the variety now mostly grown in the Midwestern soybean area; it gives a higher yield than its predecessors and has a higher oil content.



SPEEDOMAX Saves Time; Records Data Accurately

At Univ. of Minnesota, a Speedomax records skin temperature of a student eating ice-cream during experiments to determine the effect of food temperature on blood flow. The instrument automatically collects data at six test points every half minute; requires none of the researcher's attention during the course of the test. Other experiments prefer faster or slower Recorders. Write for catalogs, or consult an L&N engineer for specific information.

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Do You Know?

The temperature inside electric steel-making furnaces is about 3,500 degrees Fahrenheit.

Some 45 different kinds of *termites* have been identified on Barro Colorado island in the Panama Canal Zone.

The insecticide DDT, on a pound-for-pound basis, is claimed to be 100 times more toxic on the *Japanese beetle* larvae than lead arsenate.

Radio sets with clear reception on the ground go berserk at high altitudes in planes; in recent tests it was found that radios and radar are affected by unknown radiations when kept at high altitudes for more than a few hours.

A 5,000,000-ton deposit of *lignite* in Washington state has been proved by the U. S. Bureau of Mines; this low-grade coal-like fuel deposit can be removed by low-cost strip-mining methods and is suitable for use in special furnaces.

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GENERAL SCIENCE

Scientists' Aid Urged

British report proposes that England use her scientists to battle the present economic crisis the way she used them to help win victories during the war.

➤ ENGLAND should use her scientists to battle economic difficulties the way she used them to help win victories during the war, the executive committee of the Association of Scientific Workers of London declared in a report on science and the economic crisis.

Greater efficiency in coal and steel production and major gains in other industries are predicted if Britain turns her scientists to the present crisis.

Turning at least one-third of the scientific manpower, laboratories and equipment of Great Britain's armed forces to civilian production is one step proposed by the committee.

Other urgent proposals for British science in the economic crisis are:

The addition of three scientific and three technical members to the advisory Planning Board to the Cabinet.

Drafting of a plan for utilization of science and technology in British industry and agriculture.

Even more extensive pooling of scientific research and development in essential industries than was done during the war.

Formation of regional research councils.

Representation of scientific and technical workers on existing production committees.

Here is the way the committee believes science can help England close the critical gap between exports and imports:

More efficient use of coal would mean more coal. Raising the average efficiency of coal utilization from 20% to 25% would add 50 million more tons of coal each year.

Oxygen used instead of air speeds steel production. Work on this has been done in both Russia and the U.S. Other savings in steel could come from more careful calculations of stresses, from standardization and from closer contact between producers and users.

Waste products in the chemical, metal, brick and cement industries should be turned back into raw materials. Timber, bricks and cement could be saved by developing the pre-stressed reinforced and cellular concrete used on a large

scale in Sweden's industries.

New mass production methods should be developed.

"There is no reason why we should not use mass production methods of our own just because our markets are too small to use those of the U.S.A.," the statement says.

Research in transportation operation is needed. And science in agriculture can go far toward making Britain self-supporting in food, the committee states.

Charging that science has been neglected in the economic crisis in England, the group urges a new effort to muster science for the war of dollars.

Science News Letter, October 4, 1947

Although 15 species of *timber* are cut in Maine sawmills, nearly 92% of that cut for lumber is white pine, spruce and hemlock.

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THE SCIENTIST IN ACTION by W. H. GEORGE

A SCIENTIFIC STUDY OF HIS METHODS

This book is for those who need to do ORIGINAL thinking. CLEAR thinking. THINKING WITH A PURPOSE. Helps you to DISCOVER ideas, tells you how to DEVELOP them! Explains clearly METHODS OF WORKING to get RESULTS.

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Here's an unusual opportunity to secure a fine set of Binoculars at a substantial saving of money. Offered here are complete sets of Optics and Metal Parts for the 7 x 50 Binoculars. These components are new and all ready for assembly. We supply full instructions. Limit—1 set of Metal Parts and 1 set of Optics to a customer.

METAL PARTS—Set includes all Metal Parts—completely finished—for assembly of 7 x 50 Binoculars. No machining required. Bodies factory hinged and covered. A sturdy Binocular Carrying Case is optional with each set of Metal Parts.
Stock #842-Q.....\$39.40 Postpaid,
plus \$4.80 for Case.....Total \$44.20

OPTICS—Set includes all Lenses and Prisms you need for assembling 7 x 50 Binoculars. These Optics are in excellent condition—perfect or near perfect and have new low reflection coating.
Stock #5102-Q—7 x 50 Optics.....\$25.00 Postpaid

NOTICE Add 20% Federal Excise Tax to your remittance if you buy both the Binocular Optics and the Binocular Metal Parts.

ARMY'S 6 X 30 BINOCULARS

No Carrying Case with any Sets shown below. M-13A1 sets are waterproof model. M-3 sets are not waterproof. Limit—1 Set to a Customer on all Sets shown below.

COMPLETE OPTICS & METAL PARTS—Model M-13A1, 6 x 30 Binoculars. Everything you need—ready for assembly. When finished will look like a regular factory job costing \$102 to \$120. The Optics are new, in perfect or near-perfect condition. Have new low reflection coating. Metal Parts are new and perfect, all completely finished. No machining required. Bodies factory hinged and covered. Complete assembly instructions included.

Stock #830-Q.....\$40.00 Postpaid,
plus \$3.00 tax—Total—\$43.00

COMPLETE OPTICS & METAL PARTS—Model M-3, 6 x 30 Binoculars. The Optics in this set are new, perfect or near-perfect. Prisms have new low reflection coating. Factory mounted Eye Piece and Objective Assemblies not coated. Metal Parts are perfect, new, ready for assembly. When finished, this

will look like a regular factory job, except a name has been filed off a cover plate. No machining required. Bodies factory hinged and covered.
Stock #831-Q.....\$35.00 Postpaid,
plus \$7.00 tax—Total—\$42.00

METAL PARTS ONLY—Model M-13A1, 6 x 30 Binoculars. No Optics. Same Metal Parts as described for Stock #830-Q.
Stock #832-Q—6 x 30 Metal Parts.....\$25.00 Postpaid

OPTICS FOR 6 x 30 BINOCULARS (No Metal Parts.) Perfect and low reflection coated.
Stock #5139-Q.....\$15.00 Postpaid

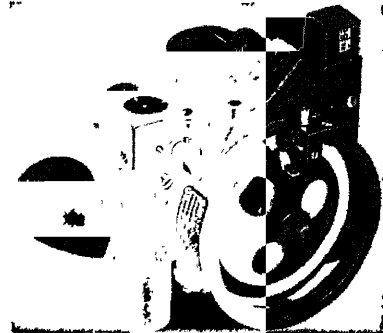
SAME OPTICS AS ABOVE—Coated—but slight seconds.
Stock #5124-Q.....\$12.75 Postpaid

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Optics and Metal Parts are Available for Monoculars (1/2 a Binocular). For Complete Details, Write for Bulletin #14-Q.

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AS THIS! BUBBLE SEXTANT Type A-10



These Army Air Forces Bubble Sextants cost the Govt about \$125.00 each. A real bargain at our price of \$12.50! Included with Bubble Sextant shipment is wooden Carrying Case, 5 spare waxed paper discs, flashlight with rheostat for night use (uses ordinary flashlight cells—not furnished), aux 2-power Galilean Telescope, Allen wrench, 1 spare marking point. Wartime used, but where necessary completely repaired, collimated and put in good working order. Light bulb has been tested—Bubble is in working condition. Because of wartime use, we make this guarantee: If not satisfied that Sextant is exactly as represented, return within 10 days and money will be refunded. Full directions for use accompany each shipment.
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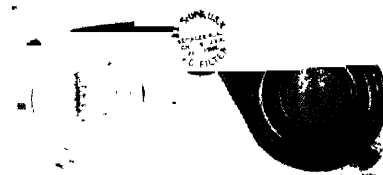
Same SEXTANT as above, but new and with Automatic Electric Averaging Device and illuminated Averaging Disc for nighttime use. Govt. cost \$217. We have checked Bubble and Collimation and guarantee perfect working order.
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CONDENSING LENSES—Seconds, but suitable for Enlargers and Spotlights.

Stock #1081-Q 8 1/2" dia, 9" F.L. \$2.50 Postpaid
Stock #1082-Q 4 1/2" dia, 6 1/2" F.L. .70c Postpaid

We have a Limited Quantity of Condensing Lenses—seconds—ranging from 4 1/2" to 8 1/2" in dia. with various focal lengths. See for Free Bulletin titled "MISCELLANEOUS CONDENSING LENSES—Q".

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Stock #763-Q—8 lbs. (min. wt.)...\$5.00 Postpaid
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Contains wide variety of projects and fully covers the fascinating uses of all Lenses in set listed above. Only \$1.00 Postpaid.

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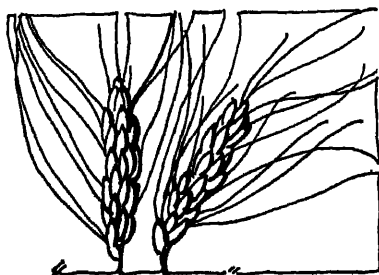
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BIOCHEMISTRY

NATURE RAMBLINGS

by Frank Thone



Trace or Tracer?

➤ **RADIOACTIVE ISOTOPES**, mostly generated in the atomic pile, have become such common items of scientific traffic that the term "tracer elements" has become familiar not only to physiologists but to the newsreading public at large. At the same time another term, "trace elements" has also become rather common property. The natural result has been a certain amount of confusion on the part of persons who keep up with scientific progress but who are themselves not professional scientists.

The distinction is really pretty easy, as a rule. Fortunately, both terms are in everyday English, so that there is no danger that confusion in tongues will increase confusion of concepts.

A tracer element is simply one that can be traced. This is usually (and most easily) done by employing a radioactive variety, or isotope, of one of the commoner, non-radioactive elements. For example, scientists who want to trace the course of common salt through

the blood and body tissues of an animal make up a little salt in which either the sodium, or the chlorine, or both, are radioactive. They can do the same kind of thing with calcium and phosphorus in calcium phosphate, one of the principal constituents of bones. Or with radioactive carbon in carbon dioxide which they "feed" to plant leaves. Afterwards, Geiger counters, electrosopes or other instruments for detecting radioactivity tell where the tracer elements have gone, and in what abundance.

Some tracer elements are not radioactive, but are tracked in other ways. In this class are heavy oxygen, double-weight hydrogen or deuterium, etc. But the most popular tracer elements just now are the radioactive ones, because tracing them is so easy.

Trace elements have been known and studied a little longer than tracer elements. They are elements that show up in ordinary chemical analyses of animal or plant tissue in such small quantities that formerly analysts never bothered to express their presence in percentages of a total, as they did for the more abundant elements like calcium or potassium or phosphorus or carbon or oxygen. These they would tabulate; then at the bottom of the table would list such things as zinc, boron, copper and manganese, with the word "trace" opposite each.

Later, biochemists and physiologists discovered that though all they could find of elements in this list of chemical Cinderellas were "just traces," these micro-quantities were absolutely necessary to the health of plants and animals, sometimes to their very lives. So now some of these trace elements are also being used as tracer elements, for it has become highly important to know where they go in plants and animals, and what happens to them.

Science News Letter, October 4, 1947

BIOCHEMISTRY

Cancer May Be Foiled by Chemical Sculduggery

➤ THE possibility that cancer can be fought by hoodwinking certain chemicals which synthesize cancer tissue is proposed by Prof. David M. Greenberg and Martin Shulman of the University of California at Berkeley. (*Science*, Sept. 19)

This theory stems from a principle used in the treatment of infectious diseases, called metabolite antagonism. Sulfa drugs, for example, do their job

by interfering with the synthesis in the body of compounds essential to the growth of bacteria.

In cancer it would work like this. About 10 of the amino acids essential to formation of both normal and cancer tissue must be obtained from the diet because the body cannot synthesize them.

Prof. Greenberg suggests withholding those amino acids and slipping the body an overdose of chemically similar antagonistic compounds. This would pull the wool over the enzymes' eyes because they cannot distinguish between the two. They would spend all their time trying to synthesize the antagonist, thus interfering with further cancer formation.

Prof. Greenberg believes adoption of this principle should bring some order out of the chaos of thousands of compounds proposed for fighting cancer and give a guiding principle for selection.

Prof. Greenberg reports that his studies on the subject are incomplete but are being continued.

Science News Letter, October 4, 1947

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Books of the Week

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ANNUAL REPORT FOR YEAR ENDED MAY 31, 1947—National Foundation for Infantile Paralysis, Pub No 68, 86 p., paper, free from 120 Broadway, N. Y. 5, N. Y. An account of the purposes and accomplishments in research, education, and medical care in the field of poliomyelitis.

COMBAT SCIENTISTS—Lincoln R. Thiesmeyer and John E. Burchard—Little, Brown & Co., 412 p., illus., \$5.00. Third in a series "Science in World War II," the history of the Office of Scientific Research & Development, which records the wartime scientific achievements of engineers, medical men, and scientists.

DR. KIRKBRIDE AND HIS MENTAL HOSPITAL—Earl D. Bond—Lippincott, 163 p., \$3.50. Biography of Thomas Story Kirkbride, a Quaker doctor, and his experimental work a hundred years ago in the city of Philadelphia at the Pennsylvania Hospital for mental patients.

EDUCATION IN NICARAGUA—Cameron D. Ebaugh—U. S. Office of Education, Bulletin 1947, No. 6—Govt. Printing, 56 p., paper, 20c. Another one of a series of basic educational studies prepared under

the auspices of the U. S. Dept. of State as a part of the program of cultural cooperation.

FUNDAMENTALS OF PSYCHIATRY—Edward A. Strecker—Lippincott, 4th ed., 325 p., illus., \$4.00. Completely revised edition of an authoritative textbook covering symptoms, method of examination, etiology, treatment and prognoses of psychoses, with emphasis on relationship between psychiatry and general medicine.

GENERAL BOTANY LABORATORY BOOK—Edward M. Palmquist and Loren C. Perry—Saunders, 174 p., illus., paper, \$2.25. Procedures for elementary laboratory work in general botany outlined.

THE MOSQUITOES OF ILLINOIS (Diptera, Culicidae)—Herbert H. Ross—Ill. Natural History Survey Div., Bulletin Vol. 24, Article 1, 96 p., illus., paper, 50c. Technical report on 52 species in Illinois, detailing their habits and presenting identification descriptions so that effective mosquito control programs can be established.

NEW WEAPONS FOR AIR WARFARE—Joseph C. Boyce, ed.—Little, Brown & Co., 292 p., illus., \$4.00. Second of a

series on the history of the Office of Scientific Research & Development, describing the development and improvement of guided missiles, proximity fuzes, and fire-control equipment.

OUTLINE OF ANTHROPOLOGY—Melville Jacobs and Bernhard J. Stern—Barnes & Noble, 332 p., paper, \$1.25. A comprehensive survey of contemporary anthropology concisely written and prepared as an introductory text.

PLACER MINING FOR GOLD IN CALIFORNIA—Charles Volney Averill—Calif. Dept. of Natural Resources, Div. of Mines, Bulletin 135, 377 p., illus., paper, \$2.00. Various methods and equipment used in placer mining described together with laws governing it and location of areas being worked.

SOILLESS GROWTH OF PLANTS—Tom Eastwood—Reinhold, 2nd ed., 277 p., illus., \$4.75. Revised and enlarged edition of 1938 book by Carleton Ellis and M. W. Swaney. Semi-technical information and practical directions presented for guidance of either professional grower or hobbyist in the field of hydroponics.

THE U. S. FIGHTS CANCER, the Cancer Program of the National Cancer Institute—Nat. Inst. of Health, Bethesda, Md., 19 p., paper, free. Information on the history, research work and control program of the National Cancer Institute.

Science News Letter, October 4, 1947

PRECISION MICROSCOPES

for Students, Teachers,
Hobbyists, Laboratories

Available now at
only **\$29⁵⁰**

This is an American-made instrument—designed and produced by optical experts to exacting standards of quality and performance. Only modern production methods could bring this microscope to you at the low price of only \$29.50

POWERFUL

Magnification from 65 to 200 diameters with 2 achromatic objectives.

PRECISION LENSES

Optically ground lenses which give a wide, flat field with sharp resolution.

EASY TO USE

Tilting device for comfortable, easy desk or lab table work

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Rack and pinion adjustment provides precise focusing movement.

HIGH QUALITY MIRROR

Optical glass, high quality concave mirror with special swivel to meet all light conditions

STAND

Large Stand with 3½" x 3½" stage.

PROFESSIONAL MICROSCOPE MAGNIFICATION 75x to 400x

This new, versatile, achromatic microscope embodies all the optical and mechanical necessities found in higher priced instruments. It is designed to bring within reach of every one, a powerful, precision instrument capable of handling most microscopic jobs. It has excellent resolving power in a range from 75x to 400x and is brought to you at an amazingly low price.

1. Fully corrected achromatic objectives
2. Exacting coarse and fine pinion adjustments.
3. Large, heavier stage with rotating diaphragm turret with six (6) different size apertures including one for dark field illumination.
4. Removable spring clips.
5. Heavily chromeplated metal parts.

Available in 3 ranges of magnification:

MODEL G-1	75x to 150x	\$42.50
MODEL G-2	75x to 300x	\$47.50
MODEL G-3	75x to 400x	\$52.50

Accessories:

Wood Carrying Case for any of the above \$6.50
Two polarizing discs for color study or organic crystals, fitting any model \$3.25 per set.

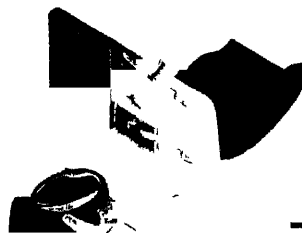
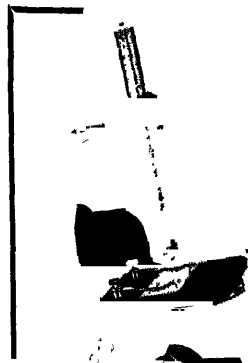
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⚙️ **ELECTRONIC** control maintains the temperature of electrically heated ovens within 0.1 degree Fahrenheit. It consists of an electronic adjustment of the input power of the oven, and works on a continuous flow of power rather than in "on-off" cycles.

Science News Letter, October 4, 1947

⚙️ **ELECTRIC** foot-warmer for use in bed is designed to give an even warmth of 105 degrees to the foot of the bed during the night. Its 36-by-17-inch cover is of sanforized cotton with a rough finish so that it will always stay in place between the top sheet and first blanket.

Science News Letter, October 4, 1947

⚙️ **SAILBOATS** for racing and pleasure, made of fiberglas-reinforced plastic, are eight and one-third feet long and carry a 15-foot mast with a 45-square-foot sail. The hull is made of cotton duck laid on both sides of a fiberglas mat, all bonded with a resin by heat-treatment.

Science News Letter, October 4, 1947

⚙️ **GASKET CEMENT**, for automotive, airmotive and wide industrial uses, provides permanent sealing, flexibility and ease of eventual dismantling. It is a synthetic, flexible, deoxidized rubber cement that does not blow out under high pressure and does resist vibration and shock.

Science News Letter, October 4, 1947

⚙️ **HARMONICA**, made of injection-molded plastic, has only 14 pieces instead



of some 150 pieces in the ordinary wood and metal instrument. The reeds of the instrument are molded in two pieces of 20 reeds each, all in correct pitch. The lever, shown in the picture, shifts from the diatonic to the chromatic scale.

Science News Letter, October 4, 1947

⚙️ **VHF TRANSMITTER** unit, for a lightplane radio, is claimed by the manufacturer to provide private planes with the advantages of very high frequency (VHF) transmission.

Science News Letter, October 4, 1947

⚙️ **WASTE HEAT BOILER**, that uses for heating the exhaust gases from a turbo-charged diesel engine, or may be operated by the household type oil burner, generates 500 pounds of steam per hour on the diesel exhaust and even more with the oil burner. It is housed in a steel cabinet a little over 6 by 7 by 3 feet in size.

Science News Letter, October 4, 1947

⚙️ **BIBETTE** for baby, recently patented, is made of flexible paper with a cut-out to fit the neck. This cut-out is severed only on the two sides, and is then creased downward to give a double covering over much of the baby's chest.

Science News Letter, October 4, 1947

You are invited to accept one of the few memberships still vacant in

Things of science

Membership is strictly limited to 10,000 and will be for at least the next nine months. This is America's most unique "club."

Each month you will receive a blue package of actual scientific specimens—experiment with them, handle them, smell them, even sometimes taste them. Clip this address label and mail with \$4 check today for year's membership.

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Enter my membership to THINGS of science for 12 exciting blue boxes of specimens. My \$4 check for one year is enclosed. Start with the housing materials unit of six museum-quality specimens (now ready).

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Question Box

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ELECTRONICS

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GENERAL SCIENCE

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15¢

SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION



We invite your aid in the
ANNUAL SCIENCE TALENT SEARCH

You may already be familiar with the Science Talent Search—an annual contest sponsored by the Westinghouse Educational Foundation to discover and encourage scientific ability among high school seniors. If so, we solicit your continued aid and encouragement to boys and girls showing promise in the field of science. If not, we would like to send you full information so you may aid qualified students.

Briefly, the Science Talent Search includes scholarship awards totaling \$11,000, plus five-day, all-expense trips to Washington, D. C., for the 40 finalists. Selection of winners is based on a Science Aptitude Examination, scholastic standing, the high school teacher's recommendation, and a 1,000-word essay on "My Scientific Project".

There is still time for students to enter the 1947 contest. As a contribution to America's scientific future, we invite your interest and co-operation. For further information, write to the address below.

G-10016

*Other Westinghouse
 Scholarships*

George Westinghouse Scholarships in Engineering—ten \$2,200 scholarships at Carnegie Institute of Technology, awarded annually to boys with exceptional mental ability, engineering aptitude and leadership qualities.

Worcester Scholarship in Engineering—a scholarship for boys providing full tuition for a four-year engineering course at Worcester Polytechnic Institute.

War Memorial Scholarships—four \$2,000 scholarships open to sons of Westinghouse employees and to junior employees of Westinghouse.

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Westinghouse

For full information on these scholarships,
 write, Westinghouse Electric Corporation,
 School Service, P. O. Box 1017, Pittsburgh, Pa.

CHEMISTRY

New Synthetic Gems Made

They are true night stones because they are far more brilliant under ordinary electric lamps than under daylight. These gems are a new discovery.

See Front Cover

► **TITANIA** night stones, a new synthetic gem with a play of colors equal to a fine opal and the fire and brilliancy of a diamond have been developed at the titanium division of the National Lead Company research laboratories, South Amboy, N. J., Dr. Roy Dahlstrom, the director, has revealed.

No name has yet been adopted for them either by the laboratory or by Dr. Charles H. Moore who carried out the development. They are true night stones because they are far more brilliant under ordinary electric lamps than under daylight, as shown on the cover of this week's *SCIENCE NEWS LETTER*. Their primary use will probably be for ornaments worn with evening gowns, but they have possible industrial applications.

Titanium is a very plentiful and widely distributed metal, never found free but only in compounds. The principal ones are ilmenite and rutile. Titanium oxide, from these, has become the principal white pigment used in paints. Rutile is used in welding-rod coatings and in alloys and carbides. Pure titanium, now produced experimentally by the U.S. Bureau of Mines, has a promising future as a structural material.

The new gems are cut from boules made of rutile under intense heat in a special automatic equipment developed by Dr. Moore. In this the process differs from the manual operation of the furnaces and burners used for synthetic sapphires and rubies. Under this heat pure rutile is grown into a mass resembling a small icicle, or boule. Boules have been made weighing 125 carats and more.

Truly a new gem, this clear synthetic rutile is in no way an imitation of anything. Rutile found in nature has a red or brown color and the only rarely discovered natural gems of rutile are semi-translucent. These clear transparent rutile gems can be produced in colors ranging from red through yellows to deep blues.

The research, which culminated in the development of these gems, was initiated to determine the true color of rutile.

Rutile pigments used to give the brightness and whiteness to paints have a slightly yellow tone. Since no way was found to determine the true color from the small pigment particles, larger pure crystals were required.

Pure rutile crystals may have other uses in addition to that of gems. Industrial uses have not yet been investigated due to the present limited laboratory production. Their atomic structure of the mineral indicates the possibility of excellent electrical, optical and sonic properties.

Science News Letter, October 18, 1947

AERONAUTICS

Jet-Propelled Flying Wing Ready for Its First Tests

► **THE** American jet-propelled Flying Wing bomber will probably take to the air earlier than a similar British plane which, however, is primarily a commercial craft.

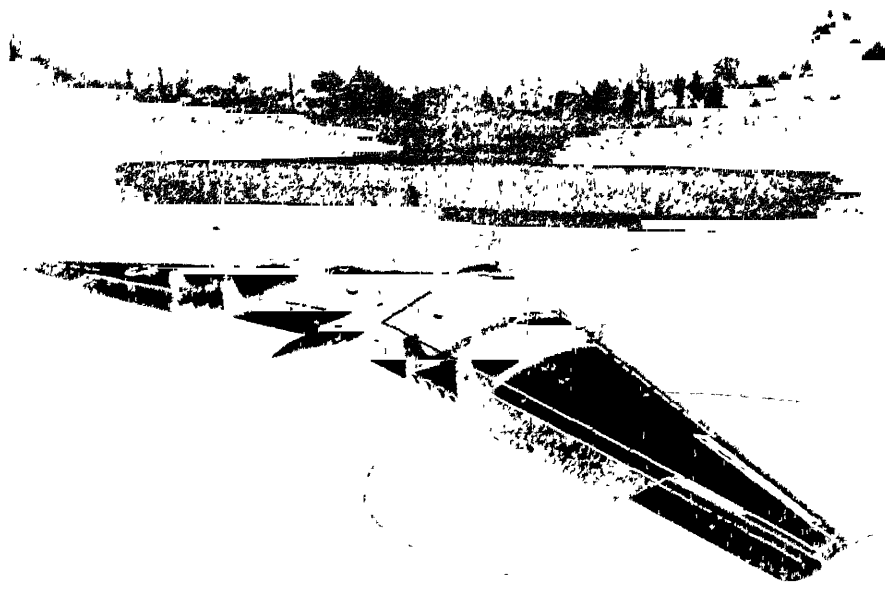
The first of the Northrop Flying Wing jet bombers is ready for ground and taxi tests following which its maiden flight will be made. It is a jet brother of the earlier Flying Wing bomber and cargo plane which has four conventional engines and revolving pusher propellers. This latter is the Army XB-35, the new jet-propelled version is the YB-49.

Both types of Northrop Flying Wings have a span of 172 feet. They are all wings; no tail, and no familiar fish-shaped body. They are the nearest approach in airplanes to a craft consisting only of a pure supporting surface, thus reducing drag to a minimum. Both are successors of several experimental models.

Few details have been revealed relative to the British Flying Wing except that it resembles, but is much larger than, a 6,000-pound glider version used in flight studies, and that it is expected to be able to cross the Atlantic in from seven to eight hours.

The American Army YB-49 is powered by eight jet engines producing the equivalent of 32,000 horsepower. This is about three times the horsepower of its propeller-driven counterpart, the XB-35. The weight of the giant plane is over 88,000 pounds, and its service ceiling will be in excess of 30,000 feet.

Science News Letter, October 18, 1947



EIGHT JET BOMBER—This is the Northrop Flying Wing YB-49. This giant is expected to operate at altitudes in excess of 30,000 feet. All crew quarters, cargo space and bomb plants are housed wholly within the wing.

DENTISTRY

New Attack on Caries

A plan has been proposed to add a simple, tasteless chemical to all sugar at the refineries as a means of banishing tooth decay at its source.

➤ YOU will be protecting yourself against toothache and tooth decay with every piece of candy you eat and every lump of sugar you drop in your coffee in the future, if a plan proposed at the American Public Health Association in Atlantic City goes into effect.

The plan calls for addition of a simple, tasteless chemical to all sugar at the refineries. It was proposed, as a means of banishing tooth decay at its source, by Dr. L. S. Fosdick of Northwestern University Dental School. (*Journal of Dental Research*, Vol. 26, No. 4.)

It is hailed as "the greatest hope for mass control of caries (tooth decay)" yet found by Dr. Hamilton Robinson, of Ohio State University College of Dentistry and editor of the *Journal*.

Tests of 31 chemicals which might be used in the plan are reported by Dr. Fosdick.

The best so far is one called glycerol aldehyde. This is a triose sugar which is a natural constituent of all muscle. It is harmless, has no objectionable taste and would mix readily with sugar.

It would stop tooth decay by checking the ferment which causes acid to be formed from sugar in the mouth. The acid, if not promptly neutralized, breaks down tooth enamel, removing the calcium, or lime, which makes it hard. Cavities form and the decay process sets in.

The decay process is not a slow, long continued one. Every time you eat sugar, or something with sugar in it, you get a short but very intensive attack of tooth decay. Unless, of course, your mouth has a good mechanism for neutralizing the acid that is formed.

Saliva is the natural neutralizer for acids in the mouth. The very act of chewing practically anything brings a more copious saliva supply into the mouth and thus a more efficient acid neutralizer.

But not everyone has such efficient acid-neutralizing saliva. Some who do may have teeth of such shape and arrangement that food lodges in places where not enough saliva can get at the acid being formed to neutralize it quickly enough.

Eliminating sugar from the diet, so there would be nothing for acid to come from in the mouth, would be one way to stop tooth decay, but very few would choose this way. Special alkaline ash diets to make the saliva a better quality would also prevent decay, but such diets are not very popular.

Best way to attack the problem, Dr. Fosdick thinks, is by a chemical to stop acid formation by checking the ferment that forms the acid. A dozen or more of such chemicals, technically called enzyme inhibitors, have been found and some of them tried.

The fluorine that acts as a tooth decay preventive in drinking water does this by checking the acid-forming ferment. But fluorine cannot be taken in more than minute amounts. It is a poison and even in relatively small amounts causes an ugly mottling of the teeth.

All the methods so far suggested for preventing tooth decay are so much trouble that, as Dr. Fosdick said, most people would rather have rampant decay than bother with them.

Putting the decay preventive into the sugar at the refineries, however, does away with the bother and gets the preventive to everyone, as almost everyone eats sugar in some form.

Whether glycerol aldehyde is the chemical to use requires further study. If it is not, the plan can still be put into effect when a better chemical is found. Amendment or revision of the Food and Drug laws would be necessary to permit the addition of the chemical to sugar. That could be done, just as it was to permit addition of vitamins to white flour for improving the health of all the people.

Science News Letter, October 18, 1947

CHEMISTRY

Red Stained Glass Made With Copper Vapor

➤ A SCIENTIFIC improvement of a chemical art practised since the Middle Ages is embodied in patent 2,428,600, awarded to a young woman chemist,

Helen S. Williams of State College, Pa., and assigned to Glass Science, Inc., of New York. It constitutes a better way to prepare red stained glass.

Red glass has traditionally been made either by adding a salt of copper to the melt, or by placing a copper compound on the surface of the hot glass, first under oxidizing, then under reducing conditions. Miss Williams introduces the copper as a vapor of copper chloride in the atmosphere over the still-hot glass, governing intensity of color in the product by adjusting time and temperature of exposure. It is even possible to make the deposit dense enough to constitute a copper mirror on the glass surface.

Science News Letter, October 18, 1947

SCIENCE NEWS LETTER

Vol. 52 OCTOBER 18, 1947 No. 16

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation Advertising Representatives, Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 8-5566, and 360 N. Michigan Ave., Chicago, State 4439.

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MEDICINE

Spleen Checks Cancer

Growth arrested in three patients following 12 weeks of treatment with a spleen extract. It is not presented as a cure for cancer.

► **THREE** cancer patients at Hahnemann Medical College and Hospital, Philadelphia, are apparently getting better after 12 weeks of treatment with a spleen extract.

The extract was made by Dr. George W. Watson of Kitchener, Ontario. Studies of its effects on the three patients and on mice are reported by him and Drs. Irene Corey Diller of the Institute for Cancer Research and N. Volney Ludwick of Hahnemann Medical College and Hospital. (*Science*, Oct. 10).

The extract is described as an improved and "much more effective product" than one made and used by Dr. Watson 18 years ago.

The patients, one with a kidney cancer and the other two with cancer of the lungs, were given the extract twice daily by hypodermic injection.

"Definite improvement in the general health of all these patients" is reported. The progress of the cancers is reported checked as revealed by X-ray studies made at regular intervals.

When the extract was injected into mice with transplanted cancers, the cancer cells had almost completely degenerated within 48 hours, as shown under the microscope. The nuclei of the cells had disappeared completely leaving structurally intact only the cell bodies. Similar signs of cancer cell destruction were seen in chemically induced cancers in mice with five days of three-times-a-day injection of the spleen extract.

The extract does not act as a mitotic poison, checking cell division. In this it is unlike various chemicals which, because of their effect on cell division, have been proposed for cancer treatment.

The spleen extract is not presented as a cure for cancer, though Dr. Watson reports that two patients treated by him have survived 12 and 13 years.

The fact that the spleen is almost never the original site of cancer and is only rarely attacked by cancer spreading from other organs is what stimulated Dr. Watson's efforts to attack cancer with a spleen extract.

Science News Letter, October 18, 1947



NEW-TYPE HEARING AID—The tiny "printed" circuit held by the young woman replaces the 173 items in the foreground which constitute the present hearing aids.

body, Mass.

The printed electronic circuit which made possible the proximity fuze of World War II is utilized in this new aid to the deafened. This is said to be its first utilization in a commercial product.

Advantages claimed for the new hearing aid are its small, cigarette-package size; its dependability even if given rough treatment; the simplicity with which it can be serviced in the remote event that this is needed; and a superior power gain over the best of conventionally wired and assembled hearing devices.

The printed electronic circuit referred to is often called printed wire. It is a line printed with a silver ink on a special stencil or wafer. Fine silver or silver oxide is used. Carbon resistors are printed in when needed with a carbon solution to complete the circuit. In this new hearing aid, a steatite wafer about the size of a calling card is used for the silver lines. The advantage of printed wire is space-saving, cost-saving and reliability.

Science News Letter, October 18, 1947

Insecticides containing the chemicals known as chlordane or benzene hexachloride are now being extensively used for grasshopper control, both as dusts and sprays.

MEDICINE

Stress May Cause Disease

► **RHEUMATIC** diseases as well as some kinds of high blood pressure and kidney disease may be due to an excessive glandular reaction to stress, Dr. Hans Selye of the University of Montreal reported at the New York Academy of Medicine.

The reaction is part of a defense mechanism of the body. The adrenal glands and the pituitary gland may be involved. First reaction to stress is what Dr. Selye calls the alarm reaction. If the stress is continued, the body acquires a great deal of resistance to it. But at the same time there is an increased production of a pituitary gland chemical which stimulates the adrenal glands. This may be what causes some kinds of high blood pressure and kidney damage.

Heart and joint damage similar to that seen in acute rheumatic fever accompany the resistant stage, due to excessive re-

action of the adrenals. Dr. Selye has found this the case in experimental animals and suggests it may occur in man.

The damaging effects of the adrenal gland hormone, produced excessively in resistance to continued stress, may be overcome in animals by diets poor in sodium or by large doses of ammonium chloride. In some cases of high blood pressure, this ammonium chloride treatment may be helpful, it appears from preliminary experiments.

Science News Letter, October 18, 1947

ELECTRONICS

New Type Hearing Aid Made With Printed Circuit

► **DEVELOPMENT** of a new type of hearing aid was announced by the Allen-Howe Electronics Corporation of Pea-

NUTRITION

Malnutrition Prevalent

At least four areas in the U. S. revealed during a survey as having a major health problem in deficiency diseases, anemia, goiter and rickets.

► VITAMIN deficiency diseases, anemia, goiter and rickets, constitute a major health problem in at least four areas of the United States, declared two nutrition specialists at the American Public Health Association meeting.

Physical signs commonly associated with these deficiencies in the diet are prevalent in each of the areas studied—Southwest, Mid-Atlantic, New England and North Central—according to Drs. Harold R. Sandstead and Elton S. Osborne, Jr., of the U. S. Public Health Service.

Approximately 25,000 persons, including school children, occupational groups and families, were inspected by mobile field units under the sponsorship of the U. S. Public Health Service. This was necessary before corrective steps could be taken and preventive measures developed that would be of practical use to public health organizations.

In order to determine the nutritional status of each person, a record of what they ate, laboratory tests and a physical examination were made. The findings were turned over to the local health officer who in turn referred them to the individual's family physician if an unhealthy condition was found.

In the more than 1,800 white school children examined in Maryland and Michigan, the speakers declared, 47% of the children in the Michigan grade schools and 46% of the high school students had enlargement of glands in the lining of the eyelids and covering of the eyeball which is usually associated with vitamin A deficiency.

In two Maryland schools the prevalence of this condition was 28% and 23% while in all the others combined it was only 2%. Vitamin B complex deficiencies and vitamin C deficiencies were also noted in that some children suffered from several tongue conditions and inflamed gums.

The family studies, which involved some 3,862 persons, provided the most complete information regarding the nutritional status of a community, stated the physicians. Among the Negro families, vitamin A and C deficiencies were

very frequent, with almost as high a prevalence among the white families.

Due to the fact that certain physical conditions change with age, differences were noted between the school and family groups. The leading physical finding among the school children, enlargement of the glands in the lining of the eyelids, diminished in the older age group, while inflamed gums increased with age. Rickets were more prevalent among children, while the prevalence of enlarged goiter was in most instances among adults.

The nutrition section of the states relations division, U. S. Public Health Service, was organized in 1945 for the purpose of assisting the states in the development of nutrition programs. The physicians, therefore, make the following recommendations for a division of functions between the state and local health departments.

At the state health department level: establishment of a nucleus of a nutritional epidemiological unit to conduct surveys and promote interest in nutrition and establishment of laboratory facilities to serve the above unit and also to be available to hospitals and local health departments for specimen studies.

At the local health department level: employment of a public health nutritionist to work continually with and through the public health nurses to promote improved nutrition in the local population.

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MEDICINE

New Way to Immunity Studied by Doctors

► A NEW kind of shot in the arm to give resistance to germ diseases by stimulating various glands of the body may be on its way.

It was suggested as worthy of further study and clinical trial in a report by Dr. Abraham White of Yale University School of Medicine to the New York Academy of Medicine.

Very small doses of epinephrine, more familiarly known as adrenalin, might

be used. This chemical, standby for relief of asthma and sometimes a dramatic life-saver for patients in shock on the operating table, is produced by a part of the adrenal glands.

These twin glands, one above each kidney, play a significant role in the body's defenses, Dr. White explained. Among other things, they cause an increase in the scavenger cells of the body that are normally called on to help fight invading disease germs. They do this, not by the adrenalin they produce, but by another chemical called the cortical hormone.

This cortical hormone chemical might itself be used for the resistance-increasing shot in the arm, or increased production of it might be stimulated by the other adrenal hormone, adrenalin. A third possibility might be the use of a pituitary gland chemical which stimulates production of the cortical hormone.

The sex glands and the thyroid, big gland in the neck, also play a part in disease resistance. Female hormones, in doses normally produced by the sex glands in the body, increase the production of cortical hormone through pituitary gland stimulus. Larger doses of female hormones and doses of male hormones have the opposite effect.

Thyroid gland hormone is needed for disease resistance in a slightly different way. It is concerned with growth of the lymphoid tissue in which the scavenger cells develop.

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MEDICINE

Diseases of Old Age Less Prevalent in Tropics

► IF one would live long, he should spend his early years in a temperate climate to avoid the infections of the tropics, and the later years in the tropics to avoid the degenerative diseases of the temperate zone.

This is the advice given the National Safety Council by Dr. Carroll L. Birch, associate professor of medicine at the University of Illinois. He predicted that when once infectious diseases are conquered, tropical lands probably will become the site of the most advanced civilization the world has ever known.

He pointed out that the degenerative diseases so common in the temperate zones are practically non-existent in tropical areas. Infections are the main health hazards in hot countries, and these primarily affect the young.

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PUBLIC HEALTH

Lepers Not a Menace

Leprosy is less to be feared than TB in a community. Misconceptions by the public create a social and medical problem which has hindered attempts at improvement.

► DISCOVERY of a case of leprosy in a community is occasion for less fear than discovery of a case of tuberculosis, Col. G. H. Rarey, national vice president of the American Federation of the Physically Handicapped, declared at the meeting of the American Public Health Association in Atlantic City.

A leper who has been "cured", in the sense that treatment has arrested his disease as TB is arrested in so-called cured patients, can be employed without danger to his fellow workers.

Public health workers, Col. Rarey declared, should teach these facts to the American public in fairness to victims of leprosy, or Hansen's disease, and also as a means of combating leprosy.

The many misconceptions about the disease in the public mind have created not only a medical problem, since they have hindered attempts to improve the situation, but a social one as well, he said.

Because patients are made to feel that the term "leprosy" is associated in the public mind with the terms "outcast", "unclean" and other untrue and harmful attitudes, an unknown number of leprosy victims are concealing information concerning their disease.

Other facts about leprosy he said should be taught are:

A large number of leprosy cases are not communicable, or "catching", and the remaining cases are now classified as "feebly communicable".

Leprosy is less communicable than tuberculosis and a number of other diseases. In over 50 years of treating and caring for leprosy patients at the National Leprosarium, not one doctor or nurse has contracted the disease, and no scientist in over 145 recorded cases has been able to infect himself or other human volunteers by attempted inoculation of the leprosy germ.

Leprosy is not a reportable or quarantinable disease in the state of New York. Although the patient is examined every six months, he may live and mingle with other people with no restrictions on his activities or employment except as a professional food

handler, or in caring for children or the sick.

Medical science has discovered new and more effective medicines for treating leprosy and the hospitalized patients are being discharged in increasing numbers, their disease arrested and of no further menace to anyone.

The uninformed public attitude is not the only barrier to the conquest of this problem. Col. Rarey pointed out that reports indicate that wrong diagnosis has seriously affected the chances for arrestment of the disease in many cases. Leprosy may often be mistaken for syphilis, since the Wassermann blood test may be positive, and for other diseases such as tuberculosis.

Col. Rarey urged a wider dissemination of the latest approved methods of diagnosing and treating leprosy to all physicians engaged in the general practice of medicine.

Science News Letter, October 18, 1947

ENGINEERING

Barnacles Removed by Heat Shock Treatment

► HOT and cold running water is being used to fight the menace of barnacles and other marine growths in 2,000-foot-long pipes which will bring in Pacific ocean water to the new Redondo Beach, Calif., steam electric generating station of the Southern California Edison Company.

Water being pumped out of the ocean to condensers in the new plant will be reversed in flow every eight hours to give the sea creatures a heat shock treatment. The rush of warmer water, plus regular injections of chlorine into the flow, is planned to avoid the difficult task of having to clean the huge water lines when they are completed.

The two pipes, constructed of steel-reinforced concrete and ten feet in diameter, are now being laid from the new plant to a structure more than 1,700 feet out in the ocean, where waves and tide will not interfere with pumping operations. Ocean water, at a temperature of approximately 65 degrees Fahrenheit,



NEW WATER PIPES LAID—They will extend more than 1,700 feet out into the Pacific ocean to bring sea water to the Southern California Edison Company's new Redondo Beach steam electric generating station. Barnacles will be removed by heat shock treatment.

is pumped into one pipe to cool condensers and convert used steam into water which will flow back into the boilers of the steam electric generating station. After the water has done its cooling job it will flow back to the ocean through the other pipe at a temperature some fifteen degrees warmer.

When the new beach-side power station is put into operation early next year the flow of water in the two pipes will be reversed three times daily. The sudden rush of warmer water into the pipe which has been carrying cooler water in from the ocean is expected to kill barnacles, small clams, sea anemones, sea snails and other ocean life which might attach themselves to the insides of the heavy concrete pipe. The warm-water treatment will also be supplemented by chlorine injections into water flowing through the pipes to poison any fouling sea life in the pipes. Filtering water pumped from the ocean to catch bigger forms of sea life and other objects will be done ashore at the pumping station.

If the shock treatment and chemical attack keep the pipes clear, engineers hope they can avoid the difficult task of sending men into the pipes to clean them.

Science News Letter, October 18, 1947

Cancer is not limited to any geographical area or race of people.

POPULATION

**Births in Starving Areas
Are on the Increase**

► THE hungry world has more mouths to feed than before the war. There are world-wide post-war shortages in food and housing, but no world shortage in babies, figures reported by the Metropolitan Life Insurance Company show.

Countries scheduled for U.S. aid under the Marshall Plan showed large increases in the birth rate. The biggest increase between 1945 and 1946 was in the Netherlands where the rate jumped one-third, from 22.7 per 1,000 population to 30.2 per 1,000. France and Italy also showed marked increases in their birth rates. Japan had an upturn since the end of the war and so did Germany, so far as the only available figures, those for the British Zone, show.

Russian birth figures are not available but hints of increases are seen in reports of official stimulus to larger families through financial incentives and special honors to mothers of large families and in the material postwar increases of the birth rates in countries within the Russian sphere of influence such as Bulgaria, Roumania and Finland.

Only four countries showed declines in the birth rate between 1945 and 1946. These are Mexico, Portugal, Chile and Sweden. Mexico had the largest decline, a little over 5%, but nevertheless led all other countries with the highest birth rate. Babies were born in Mexico in 1946 at the rate of 42.5 per 1,000 population, but at the rate of 44.9 in 1945.

The general postwar rise in the birth rate, however, is considered only temporary. The trend is expected to be downward before long, as it was generally after World War I.

Science News Letter, October 18, 1947

PEDIATRICS

**Babies Grow Well
On Own Feeding Schedules**

► THE latest trend in feeding little babies is to let them set their own time schedule for eating and take as much or as little as they want at a feeding. It sounds like heresy to the previous generation of mothers who were taught to keep baby on a strict schedule and who worried, as mothers in any age seem to, over whether baby got enough food or too little. The answer to doubts is given by Drs. C. Anderson Aldrich and Edith S. Lewis, of the Mayo Clinic and the

Rochester, Minn., Child Health Project. (*Journal, American Medical Association*, Oct. 11.)

The babies do all right, judged by their height, weight, and appetite at about the time of their first birthday. Ninety-two out of 100 have excellent appetites. The average height for 668 babies on a self-regulating feeding program almost from birth was 29.4 inches at the age of one year. The average weight was 21.8 pounds. These figures, the doctors say, compare favorably with the generally accepted standards.

The babies were put on their own, as it were, as soon as they and their mothers went home from the hospital. Mothers were told they could feed the babies all they wanted to eat when they seemed hungry. They did not have to wake them by the clock to feed them at a prescribed time. Within a few days or weeks, the babies arranged a schedule for themselves. At first, most of them woke up and cried for food every three hours. Of 100 babies, 61 put themselves on the three-hour schedule by the end of the first month, 10 chose a two-hour schedule and 26 chose the "more approved" four-hour schedule. One was on four meals a day and two were still too irregular to be graded.

As they got older the babies switched by themselves to longer intervals between feedings. By the ninth month all but 10 were on either three or four meals a day. The study shows, the doctors point out, that a rigidly prescribed routine of feeding could fit the needs of the average baby but not those of the precocious or of the slow to change.

Science News Letter, October 18, 1947

AGRICULTURE

**2,4-D Not Recommended
For Killing Potato Vines**

► CHEMICAL killing of potato vines before harvesting, though recognized as good farm practice, should not be carried out with 2,4-D, the U. S. Department of Agriculture warns. Trouble is that 2,4-D does not stop with killing the vines; it penetrates to all parts of the plant, including the tubers, and sometimes injures them severely.

There are a number of herbicides that act only on the overground parts of plants, including cyanamid and several dinitro compounds. These are recommended as satisfactory vine killers that will not affect the potatoes themselves.

Science News Letter, October 18, 1947

IN SCIENCE

EDUCATION

**Train to Tour in Britain
Exhibiting Atomic Energy**

► BRITAIN will have an atomic energy exhibition train which will tour the nation from November to April, much the way the American Freedom Train is barnstorming America.

The British Atomic Scientists Association is planning this public education activity in connection with local atomic energy weeks during which the social causes of war will be studied.

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INDUSTRIAL MEDICINE

**Cancer Increase Foreseen
In War Industry Workers**

► FORMER employees of war plants will have an increasing number of cancers in coming years as a result of exposure to cancer-producing agents, predicted Dr. W. C. Hueper of the Warner Institute for Therapeutic Research in New York.

Under the pressure of war, plants were built and manned by persons not adequately familiar with occupational cancer-producing hazards derived from the use or production of these dangerous agents, Dr. Hueper pointed out.

However, he said that it would require 10 to 20 years to reveal the occurrence of cancer in the former employees of these plants.

Pointing to the types and numbers of persons who may be exposed by their occupation to cancer-producing agents, Dr. Hueper listed workers employed in industries producing, using and handling raw materials and semi-finished goods; employees of workshops, trades and professions, using the products of these industries; workers of transport and merchandising trades, handling these industrial products with the cancer-producing qualities during the process of packing, loading, shipping and selling, as well as the general public which buys and consumes such goods.

Dr. Hueper's prediction was made at the International Cancer Research Congress meeting in St. Louis.

Science News Letter, October 18, 1947

THE FIELDS

METEOROLOGY

Earth's Weather Made by Ten-Mile-High Air-River

► WEATHER down here on the ground consists largely of great whirling eddies cast off from a vast air-river ten miles up, that flows from west to east around the earth, with speeds up to 200 miles an hour. These whirlpools of air, hundreds of miles in diameter, drift downward, and storms result when they reach the planet's surface.

This Titan's-eye view of the making of weather, which goes far toward accounting for the cold and warm air masses shown on the daily weather maps, was evolved by Prof. Carl G. Rossby, University of Chicago meteorologist, after a study of radiosonde data sent back by featherweight robot weather instruments borne to great heights on thousands of free-floating balloons.

Another technique for studying weather at great heights involves the use of long-range rockets like the German V-2's now making research flights at White Sands, N. Mex. Dr. Michael Ference of the University's meteorology faculty states that plans include loading such rockets with large quantities of chemical smoke, to be released at super-stratosphere levels. Bending or breaking of the smoke trails will tell directions and relative velocities of these winds far above the world.

Science News Letter, October 18, 1947

PSYCHOLOGY

Auditory Afterimage After Loud Buzzing

► DISCOVERY of an "auditory afterimage," never found before, is reported from Harvard's Psycho-Acoustic Laboratory at Cambridge, Mass.

After a buzzing sound of high intensity is listened to, familiar sounds of the human voice, a typewriter or a handclap take on a strange metallic quality that is "jangly" or "twangy." In the world of sound, Harvard scientists suggest, this is an "afterimage" just as the eye sees a replica of a photographer's flash a few seconds afterwards.

Almost everyone who has been photographed by a news photographer has

noticed a bright or dark replica of the flash dancing before his eyes. Or a phantom replica of the sun can be seen after looking at the real sun. These optical or visual afterimages are familiar phenomena.

The discovery of the auditory afterimage is reported, with a question mark, by Drs. W. A. Rosenblith, G. A. Miller, J. P. Egan, I. J. Hirsh and G. J. Thomas. (*Science*, Oct. 10.)

Scientists have long been puzzled by the fact that no one has noticed any afterimage of hearing. A deafening sound like that of an airplane motor or boiler factory will produce a "ringing in the ears." But this is something that may persist for hours and is more like "spots before the eyes" than like the afterimage.

The auditory afterimage seems to be the same no matter what kind of sound it is accompanying. It is what the scientists describe as a "metallic, ringing obligato." It lasts a number of seconds, the duration depending on the duration and the intensity of the loud buzzing sound that caused it.

If silence follows the buzzing, there is no "auditory afterimage." To get the effect, there must be a sound to be affected.

Science News Letter, October 18, 1947

ARCHAEOLOGY

First Mayan Ruins Explorer Honored by Plaque

► THE first modern explorer to discover the monuments left by the Great Mayan civilization now has a monument of his own. John Lloyd Stephens in 1841 described his important finds with scientific exactness in a book which is still a classic in the field. The memorial plaque in the New York Marble Cemetery in his honor was dedicated on Oct. 9.

Stephens' extensive travels through Central America took place previous to 1841, and it was his description of the great wealth of archaeological treasure that he uncovered there and his evaluation of the importance of the Maya civilization, that roused the interest of scientists in studying Middle America sites.

John Lloyd Stephens was born in Shrewsbury, N. J., in 1805 and was a lawyer by profession. He was one of the first of America's diplomatic travelers to combine his political mission with the work of a cultural envoy.

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PUBLIC HEALTH

Tick Fever Virus Found In Long Island Dog Ticks

► THE possibility that Colorado tick fever may attack residents of Long Island, N. Y., and other regions far from Colorado appeared in a report by Dr. Lloyd Florio and Miss Mabel O. Stewart of the Colorado Health Department at the meeting of the American Public Health Association.

They found the virus of Colorado tick fever or a very closely related virus in dog ticks from Long Island although the disease has never been diagnosed in this area.

The Western strain of the virus is believed to be transmitted by the wood tick although it has never been isolated from ticks in nature. However, when the infected ticks are ground and injected into hamsters, rodent-like animals used for laboratory experiments, they show infection with Colorado tick fever. These results parallel those obtained with Rocky Mountain spotted fever.

Science News Letter, October 18, 1947

GEOLOGY

New Major Oil Field Found Near Caspian Sea

► A NEW oil field has been discovered in Soviet Azerbaijan near the Caspian sea, it was reported in Washington by the Embassy of the Union of Soviet Socialist Republics. It is said to be a major oil field, and two young Soviet geologists responsible for the discovery have been awarded Stalin Prizes for their work.

Azerbaijan is one of the constituent parts of the Soviet Union. It is an area with a population of approximately 3,500,000, and about the size of Maine. It is in the southeast corner of the U. S. S. R. and borders a northern province of Iran also called Azerbaijan. The new oil field is relatively nearer the older Baku fields, which are on a peninsula that projects into the Caspian.

This Baku area is some 400 miles northeast of the great oil fields of Iraq, in which British and Americans have primary interests. It is also within a few hundred miles of oil production in the Caucasus region between the Black and Caspian seas, one of Hitler's objectives in the Nazi drive into southeastern Russia during the recent war.

Science News Letter, October 18, 1947

POPULATION

More Mouths Than Food

To prevent war the world needs fewer babies. Experts believe that a population race at this time would be as disastrous as an atomic armament race.

By MARJORIE VAN DE WATER

► TO PREVENT war, the world needs fewer babies. Cutting down birth rate is a better way to insure peace than reduction of armaments.

Some parts of the world are growing enormously. Other parts are hardly holding their own. There is just not enough food in the world to feed everybody. Result: fear and want and international problems.

Experts believe that a population race at this time would be as disastrous as an atomic armament race. Yet population problems remain unsolved.

Compare these figures: The U.S.S.R. in 1940 had 170,000,000. The U. S. had 132,000,000. China had 400,000,000. England and Wales had only 42,000,000.

Each year brings a new crop of babies. But the stork does not bring the baby crop to the countries having the biggest food crops. On the contrary.

U. S. Well Fed

The United States with relatively few babies to add hungry mouths to the population is one of the few countries where people get enough to eat. Nutrition experts set the figure of 3000 calories as the amount a moderately active man should eat each day. Uncle Sam's nephews are among the few of the world's people who actually get more than that. And our diet is pretty well balanced. Only 27 per cent is in cereals—the food that people fill up on when they can't get enough meat and green foods.

More than half the world's people are hungry. An even 50 per cent can't have as much as 2250 calories for each person each day, United Nations experts say.

Russia's 170,000,000 eat less than the necessary 3000 calories daily. They get only 2827 calories of which 65 per cent is cereal. That means not enough of meat and milk and sugar.

Other parts of the world are even worse off. China's 400,000,000 get only 2201 calories a day and 70 per cent of this diet is in cereal—rice. India eats 2021 calories apiece and 64.6 per cent is

cereal. In all South America only three countries—Argentina, Paraguay and Uruguay—eat well. Four other big South American countries for which figures are available average only 2264 calories of which 37 per cent is in cereal.

More mouths to feed will mean more hunger, unless food supplies can be increased far beyond expectation. And the pressure of hunger often drives a nation to look for expansion, new territory, more sources of food supply. Here are the seeds of war.

Thus in the U.S.S.R. the births each year far outnumber the deaths, 37 per thousand to 19. Even allowing for the war-caused death and lack of births, it is expected that the U.S.S.R. will have 48,000,000 more persons in 1970 than she had in 1940 or a total of 218 millions. That is an increase in population much greater than the total population of England and Wales in 1940. It means a gain of nearly 28 per cent over Russia's population in 1940.

The United States is growing, too. But our gain is smaller not only in actual numbers but in percentage of our 1940 population. Our birth rate is 17 per thousand compared with Russia's 37. Our death rate is, however, lower than hers—11 per thousand. The gain in population between 1940 and 1970 will be 28,000,000. That is about 20 per cent of the number we had in 1940.

Our Peak in 1990

But if we follow our present trends of births and deaths, we will reach our peak of population in 1990—in 43 years. After that our population is expected to drop off.

For Russia, there is no peak in sight. She is expected to go right on growing.

China, even when she is without war, is a land of catastrophes. It is estimated that China has an average of about 49 droughts and 48 floods every 100 years. That means an average of one major catastrophe every year. In addition, epidemics come along every five years.

China's birth rate tops Russia's. It is estimated at between 38 and 50 per

thousand, Dr. A. J. Jaffe reports in *Human Biology*. But in relatively normal and peaceful times, China has a death rate of between 30 and 40 per thousand. If this rate does not go up or down in the future, she would grow just about 10 per cent each generation. And 10 per cent of 400,000,000 is 40,000,000, practically the population of England and Wales.

South America may expect an increase of 48.6 per cent by 1960, UN food experts calculate.

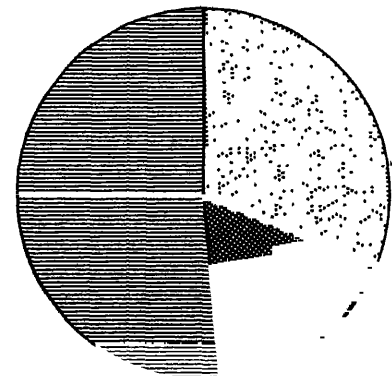
Let's look forward a few years to 1960. How many more will pull up chairs hopefully to the world's dinner table? The following figures are only a part of the story, but they will give you an idea.

In the world as a whole, each table now set for four people must pull up one extra chair in 1960. But neither the food on the table nor the increase in mouths to feed is equally distributed.

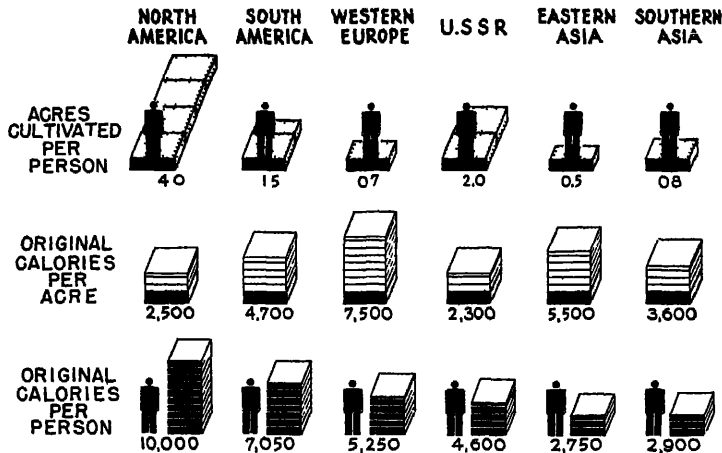
In the U.S.S.R. each table for four must set at least one extra place. But in the U. S., where we now enjoy more than the 3000 calories we need, we will add only one extra place for every seven now eating.

Here are the figures showing the number of people to be fed today and in 1960.

U. S. today.....	132,000,000
must add	21,000,000
U.S.S.R.	170,000,000
must add	29,000,000



WORLD CALORIE DIAGRAM—
The striped section represents the portion of the world that gets below 2250 calories; the light dotted part shows those getting between 2250 and 2750 calories, and the dark part represents the well-fed population.



FOOD PRODUCTION—Calculated per person, North America leads with a production of 10,000 calories for each individual. Russia produces 4,600 for each of her 170,000,000 people—a narrow margin when one considers her rate of growth.

India	382,000,000
must add	45,000,000
China	400,000,000
must add	60,000,000

Where is the food produced? Here again the United States leads with a production of 10,000 calories for each of our 132,000,000 people. This is naturally much more than the 3000 that we need to eat. We export a great deal.

Russia produces 4600—a narrower margin especially when you consider her rate of growth. She needs to eat more, especially meat. Asia produces from 2750 to 2900 calories per person. That is low. South America is between the U. S. and the U.S.S.R. with 7050 calories per person, but this includes their meat production. Meat is not produced on cultivated land, but on the range.

Four Acres Per Head

In the U. S., there are four acres of land under cultivation for every person. Compare that with the two acres per person cultivated in the U.S.S.R., one and a half acres in South America and less than one acre in western Europe, and Asia.

Obviously, the need is to cultivate more land, and to cultivate it more intensely so that more food is produced. Some can be imported by starving countries. But, food is perishable. Transportation is difficult. It is far better, when possible, to produce it where it is eaten.

There is possibility of improvement. The output of food per person is 10 times as great in the more advanced countries as it is in the poorer countries,

estimates the UN Food and Agricultural Organization. Chief needs are for education, for farm machinery, for fertilizer, for control of erosion, and for control of plant and animal pests.

But there are also severe limits to the amount of land that can be brought into profitable production due to climatic conditions and erosion. For example, in the U.S.S.R., the frozen soil of the Arctic and the arid desert regions of the steppes both put obstacles in the way of increasing the amount of farmed land in a large part of the country.

The U.S.S.R. is believed by population experts to need a large population to develop her enormous resources. This is indicated in a recent League of Nations report by Dr. Frank Lorimer of American University. But whether she can grow food fast enough to fill all the hungry mouths coming into the world is a question.

Migration is a natural solution to the problem of many people and scarce food. If they are let alone to do what they

want to do, people usually will travel from lands of hunger and want to places of greater opportunity. But the natural flow of people is now cut off by all sorts of legal barriers.

Close Immigration Doors

Countries which once were lands of opportunity have now closed their doors. Other countries, whose peoples might want to migrate, are keeping them jealously at home for fear of cutting down on the supply of young men of military age. The situation is surveyed by Dr. Dudley Kirk of Princeton for the Milbank Fund.

The greatest present potential source of migration is the U.S.S.R. with its millions of people and ever-increasing number of babies. But, Dr. Kirk tells us, almost since its founding the Soviet Union has forbidden free emigration from the U.S.S.R. Now, several other Eastern European countries are following her example.

That leaves two other great sources of potential migration—Italy and Germany. The 13,000,000 displaced Germans Dr. Kirk considers the greatest potential source of migration. Just what will be the attitude of other nations toward receiving these homeless people remains to be seen.

Could we take people in? Certainly we could afford to admit all that our present laws permit. This would amount to only 153,000 a year. Dr. Warren S. Thompson, director of the Scripps Foundation for Research in Population Problems, estimates that this would not add more than 4,500,000 to our 1970 dinner table.

Science News Letter, October 18, 1947

Birds seem to have either no sense of *taste* or else a very strange one; they swallow without hesitation berries and small fruit that are bitter, nauseous, insipid or tasteless to humans.

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DENTISTRY

Rhubarb Protects Teeth

This fruit may become a year-around food since it has been demonstrated that when mixed with lemon juice it will protect teeth against erosion with acids.

➤ RHUBARB may become a year-around food as a result of a discovery in the Animal Nutrition Laboratory at Cornell University, Ithaca, N. Y. Rhubarb protects teeth against erosion by acids, Prof. C. M. McCay of Cornell has found.

Dentists in recent months have reported that some patients have part of their front teeth dissolved off from daily drinking of large amounts of lemon juice in the treatment of constipation and arthritis.

Basic studies at Ithaca indicate that about one cup of rhubarb juice mixed with four of lemon juice will prevent this erosion of teeth.

The discovery has a history, starting when Prof. McCay was assigned in the autumn of 1943 to temporary duty with a construction battalion unit of the Navy. Purpose was to learn how to improve the cookery of dehydrated foods when the kitchen and mess hall were two Quonset huts on a sandy island.

While not thus employed, a study was made of foods bought by men outside the mess hall. These consisted mostly of candy and soft drinks. Most popular of the soft drinks were the cola beverages which contain substantial amounts of phosphoric acid. The question arose, "would this acid erode teeth?"

When Prof. McCay returned to the medical research center of the Navy at Bethesda, Md, he obtained the help of a Navy research dentist. Human teeth were immersed in cola beverage. They softened in two days.

This observation led to the feeding of the same soft drinks to experimental animals. In every case in about two to eight weeks the surface of the molar teeth of these animals was partly dissolved away by the beverage.

Studies with many other common acid beverages were then undertaken. Both lemon juice and synthetic lemonade were found to etch teeth as badly as the cola beverages.

Then came the long search to discover some natural foodstuffs that would protect teeth against this action of acids. Small amounts of fluorides were tried but they gave only partial protection.

After nearly two years the group of research dentists and nutritionists discovered, purely by accident, that a small amount of oxalate in an acid beverage would completely protect the enamel of teeth. Involved in the discovery was the feeding of acid beverages to several hundred rats, mice, dogs, and hamsters.

After this, advancements were rapid. Nutritionists had long known that many foods contained substantial amounts of oxalate. Rhubarb and spinach are two of the richest.

Prof. McCay returned to Cornell in 1946 and continued the researches. Trials are now in progress to learn how much rhubarb juice must be drunk or how much sauce eaten to provide the best protection for teeth. Rhubarb has long been recognized as a good laxative and a tasty food. Hence it will not detract if mixed with lemon juice to prevent constipation, says Prof. McCay.

At present no one can anticipate how much these discoveries will expand the market for rhubarb and its juice, but a new industry may arise—the bottling of rhubarb juice and the canning of rhubarb sauce.

Science News Letter, October 18, 1947

In early colonial days the *topsoil* in America was about nine inches deep; today it is about six inches on an average for the nation as a whole, but in some areas it has been entirely lost.

YOUR

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AND ITS CARE

By O. L. Levin, M.D. and H. T. Behrman, M.D.

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PSYCHOLOGY

Obesity Hides Insecurity

Fat young girls don't reduce because their overweight is a protection against men and sex and the responsibilities of grown-up womanhood.

➤ MANY fat young girls stay fat because it is a protection against men and sex and the responsibilities of grown-up womanhood which they dread even more than the disgrace of being fat, Dr. Hilde Bruch of Columbia University College of Physicians and Surgeons told a medical audience at the New York Academy of Medicine.

The reason why fat people loudly bemoan their size without ever doing anything about it is that the fat person started out as a timid person who came to depend on his bulkiness for a feeling of strength, safety and power.

Fatness, or obesity as it is termed in medical circles, comes from eating more calories than are spent in energy and activity. The treatment of obesity therefore seems simple: Reduce the food intake and increase the exercise. But, Dr. Bruch pointed out, the fat patient just will not stick to "the perfect well-balanced reducing diets which we prescribe, nor does he follow our advice for more active participation in social life that should make for greater happiness and better adjustment."

"The basis of rational treatment of obesity," she said, "is an understanding and respectful attitude towards genuine problems. The obese patient needs the sympathetic support of a physician who will help him to gain insight gradually into the nature of his real problems. This can best be accomplished by regular and continuous contact. Prescription of a diet alone is rarely sufficient."

The essence of the problem of fatness, she said, is expressed in the saying of a modern writer, "Imprisoned in every fat man, a thin one is wildly signalling to be let out."

The doctor trying to help a fat patient reduce needs to understand that the reason fat people avoid muscular activity and social contacts is that these are associated with the idea of danger, threat and insecurity. This explains, too, why fat people can go on eating without any exercise to give them an appetite or use up the calories. It is because food stands for love, security and satisfaction.

Sometimes the very unattractiveness of obesity serves a definite emotional

purpose. It offers a seemingly obvious reason for avoiding situations which might provoke fear and anxiety.

Looking for the psychological causes of obesity, Dr. Bruch found the family setting important. Typically the family of a fat child is a small family, with the father playing a subordinate role. The mother may be trying to realize in her child her own dreams of a life of luxury and idleness of which she feels herself deprived. Her way of showing affection is to over-feed the child and spare him the necessity of doing things for himself. Her attitude toward her fat child is like that toward an inanimate and prized possession, such as a fine piece of furniture or clothing, to which she gives the best of care in order to retain it. Mixed with this is a feeling of hostility toward the child and irritation

over the demands her excessive care of him make on her. So she nags and criticizes him for his awkward appearance and scolds him for being greedy at the same time that she constantly uses food as a bribe to keep him close and dependent.

Science News Letter, October 18, 1947

MEDICINE

VA Opening Heart Center For Research and Training

➤ THE Veterans Administration is developing a heart disease center at Mount Alto Hospital in Washington. Treatment and research will be conducted with all the modern medical tools under the supervision of Dr. George P. Robb, widely known heart specialist. The hospital will also serve as a training center for VA doctors wanting to specialize in treatment of heart disease.

Heart disease is the most frequent cause of death among veterans as it is among the population generally. It also is one of the most frequent causes of sickness requiring lengthy hospital stays among veterans.

Science News Letter, October 18, 1947

SELECTED WRITINGS OF BENJAMIN RUSH

DAGOBERT D. RUNES, *Editor*

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➤ RIGHT NOW, in mid-October, is really the best time to go shopping for your Christmas tree. Not that you will find the street-corner stands stocked with little firs and pines at this time of year. Christmas trees of that kind will come along, as usual, during the last rushed week or two before Christmas Eve, and will undoubtedly be in bad condition and overpriced—also as usual. And once set up, they will dry and die before the Yule season is ended; they will litter the floor with shed needles, and will be fire hazards and nuisances generally.

This unsatisfactory performance is all you can expect from the conventional Christmas tree. It is really only half a tree anyway; its roots, necessary for maintenance of anything like normal condition, have been amputated and left in the ground. It is a dying tree, and such treatments as setting its base in a can of water or spraying its foliage with preservative formulae only postpone its end a little while.

If you want a normal living Christmas tree, now is the time to get it. Nursery stock is still being dug and shipped for fall planting, except in the northernmost areas of this country. It should not be difficult to find a suitable small evergreen and have it planted in a tub, where it will have a chance to recover from transplantation shock and be in good condition by the time the holiday season arrives.

Your tree need not be moved into the house immediately. It can be left outdoors, on the porch or in the yard, with no more attention than an occasional moderate watering. It will not need much water, even, for growth is

now at a standstill and replacement of the relatively small amounts transpired through the foliage is all that is called for.

After it has been moved into the living-room for its brief season of glory, with lights for flowers and lollipops and toys for fruits, your tubbed tree will not need to be flung out, to lie like a reproachful corpse until it is carted away by the trash collector or chopped up to

burn in the fireplace. It can be put outdoors again—perhaps into a previously prepared pit among the shrubbery—and left to live through the winter and awaken and grow again in spring, as a normal young tree should. It can survive to do its Christmas duty year after year, becoming as much a part of the family as the dog or cat.

Science News Letter, October 18, 1947

PSYCHOLOGY

Mamas Like Their Babies

Two-thirds of quizzed mothers have no complaint to make against their babies' behavior. Possibly they have acquired a realistic attitude toward infant habits.

➤ "WHAT habits does your baby have of which you do not approve?"

More than 600 mothers of babies about one year old were asked that question at the Rochester, Minn., Child Health Project.

Over two-thirds of the mothers, 424 out of 623, surprised the doctors by reporting their babies had no unapproved habits, Dr. C. Anderson Aldrich, Mayo Clinic pediatrician and director of the Child Health Project, reported to the American Public Health Association meeting in Atlantic City.

Maybe, Dr. Aldrich said, the doctors at the project had been more vividly impressed by active complaints mothers made about misbehavior than by lack of them, and thus had an exaggerated idea of the number of such complaints.

Second possible explanation of the large number of non-complaining mothers is that the mothers, who had been bringing their babies regularly to the project since their birth, had learned a realistic and tolerant attitude toward infant behavior.

Third possible explanation is that because of the doctors' efforts at the project to adjust routine care to the steps of normal growth and development, the babies actually were better behaved than is usual.

The extremely high ideals which some mothers seem to hold for their children were seen in the replies of those who reported unapproved habits.

"Such behavior as hair-twisting, or wanting a bottle at bedtime would hardly be called 'unapproved behavior' by most people of experience with babies," Dr. Aldrich commented.

The overwhelming majority of complaints were for what the doctors called repetitive habits. Most of these, 137 out of the 216 total number of complaints, were for thumb-sucking. This behavior may be even more frequent, because many mothers did not list it. They considered it normal behavior at this age, "an attitude with which we are inclined to agree," Dr. Aldrich reported.

Thumb-sucking, he and his associates think, is merely the sign of a lingering sucking instinct which has not yet disappeared and is unsatisfied at the time when the baby is weaned and given milk from a cup. This is particularly true, he said, when, as in the vast majority of cases, thumb-sucking appears only when the child is hungry or sleepy. When the habit persists for a large part of the waking day, it is probably more significant as a sign that the child is unable to proceed into more grown-up forms of activity.

Only 52 of the 664 babies were complained of because of refusing to eat or needing coaxing. In 39, the mothers complained of a voracious appetite as unapproved behavior. Sleeping habits caused complaints in about 118 of 661.

Noteworthy, Dr. Aldrich commented, was the fact that no mother listed unapproved behavior related to eliminative functions.

Only 11 complaints were made of crying, which when compared with the almost universal crying of newborn babies points up the often forgotten fact that this unwelcome behavior is a disappearing function typical of the infant three months old or less and becoming rare by the end of the first year.

Science News Letter, October 18, 1947

Books of the Week

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BASIC BIOLOGY—Carroll Lane Fenton and Paul E. Kambly—*Macmillan*, 726 p, illus., \$3.24. For high school students, this well-illustrated text presents fundamental facts, problems, and principles in all fields of life science.

BULBS FOR BEAUTY—Charles H. Mueller—*Barrows*, 296 p, illus., \$3.50. A practical manual for gardening with bulbous plants, including a description of their botany as well as a seasonal planting sequence with month-by-month reminders for bulb-garden tending.

CHICAGO NATURAL HISTORY MUSEUM ANNUAL REPORT, 1946—139 p, illus., paper, \$1.00. The yearly report covering all phases of the Museum's operations.

COLLEGE PHYSICS—Arthur L. Foley, rev. by J. L. Glathart—*Blakiston*, 4th ed, 703 p, illus., \$4.25. The revised edition of this popular text for first year college students emphasizes physics as a 'useful subject' and integrates many new developments, including nuclear physics.

DEEP ANALYSIS—Charles Berg—*Norton*, 254 p, \$3.50. In language intended for the non-professional reader a British physician describes in detail a single case of deep Freudian analysis, with a chapter explaining his technique.

ELEMENTARY NUCLEAR THEORY—H. A. Bethe—*Wiley*, 147 p, \$2.50. A clear, mathematical treatment of the fundamental theory of nuclear forces intended primarily for those familiar with the technical vocabulary of nuclear science.

THE GENUS CREPIS—Ernest B. Babcock—*Univ. of Calif.*, illus. Pt. 1—\$3.50 paper, \$4.00 cloth; Pt. II—\$10 paper, \$12 cloth, both parts—\$13.50 paper, \$15 cloth. A composite genus, interesting for its widespread distribution and great variability. Part I treats of genetics, geobotany, etc.; Part II comprises the taxonomy.

HOW TO BREED DOGS—Leon F. Whitney—*Orange Judd*, rev. ed, 418 p, illus., \$4.50. Basic scientific principles of reproduction and heredity in dogs, explained understandably, with particular reference to their application in practice.

AN INTRODUCTION TO MODERN ARCHITECTURE—Elizabeth Mock and J. M. Richards—*Pelican*—128 p, paper, 35 cents. Tells what modern architecture is and is not, and provides other valuable information for prospective home owners, builders, engineers, city planners, and others interested in this important subject.

THE NEW INTERNATIONAL YEAR BOOK—Charles Earle Funk, ed.—*Funk & Wagnall's*, 752 p, \$10.00. A compendium of the world's progress for 1946, an important period of transition in history from war to peace in the atomic age.

PARTICIPATION OF THE UNITED STATES GOVERNMENT IN INTERNATIONAL CONFERENCES—July 1, 1945-June 30, 1946—Department of State Publ. 2817, Conf. Series 95—*Govt. Printing Office*, 292 p, paper, 75 cents. Contains brief accounts of all international conferences in which

the U. S. Government participated during this period.

PHARMACEUTICAL LABORATORY MANUAL—R. A. Kuever—*Lippincott*, 290 p, \$2.75. Designed to stimulate the student's interests in pharmaceutical operations, and to supply a thorough course of experiments, progressing from the simpler to the more complex.

THE STANDARD BOOK OF SEWING—Drucella Lowrie—*Halcyon House*, 237 p, illus., \$2.00. A complete handbook on the art of sewing, describing basic procedures and many special problems; illustrated with informative diagrams.

TEXTBOOK OF THE NERVOUS SYSTEM. A Foundation for Clinical Neurology—H. Chandler Elliott—*Lippincott*, 384 p, illus., \$8.00. A new approach to learning the structure and function of the human nervous system, presenting clearly the details of both neuroanatomy and neurophysiology.

Science News Letter, October 18, 1947

MEDICINE

Restrictions Overdone in Rheumatic Heart Children

➤ MANY a schoolchild with rheumatic heart disease or who has a heart murmur has his activities restricted needlessly, Dr. George M. Wheatley, assistant vice president of the Metropolitan Life Insurance Company, told members of the American Public Health Association meeting in Atlantic City.

More emphasis should be placed on referral by teachers and nurses of pupils believed to be below par for medical review, he stated in advice to school health authorities.

School absences due to illness or vague disorders may, if investigated, lead to detection of early cases of acute rheumatic fever.

"Relatively few rheumatic children attending regular school in the intervals between attacks need to have their physical activity restricted," Dr. Wheatley declared.

"In a group of 1000 rheumatic children seen 10 years after they first came under observation, 783 were alive and of these more than 80% were able to lead normal active lives except in competitive sports. More than half were able to engage in competitive sports."

School medical examinations should be improved to aid in more accurate recognition and supervision of rheu-

matic children, Dr. Wheatley advised. He also urged special diagnostic and consultation services to aid school physicians and other doctors who may advise parents concerning the care of children with potential or definite rheumatic heart disease.

Science News Letter, October 18, 1947

SAFETY

Road Habits Recorded By Automatic Camera

➤ "CONSCIENCE," some wag defined, "is that faculty that warns you someone is looking."

A pretty fair mechanical equivalent for a conscience, to watch over the ways of truck and bus drivers, has been invented by George B. Finnegan, Jr., of Mountain Lakes, N. J., and Hobart N. Durham of Munsey Park, N. Y., who have just received U. S. patent 2,428,273 on their device.

It consists of an electrically operated camera in a weather-tight housing, to be mounted on top of the vehicle. During ordinary, straight-away driving, it snaps a picture of the road ahead on eight-millimeter film about every 500 feet. Where more careful driving is demanded, as on sharp turns and when slowing down to a stop, the rate is automatically changed to one exposure every 50 feet. The magazine is large enough to hold film sufficient to record very long drives.

The pictures, when developed, will give a fairly continuous record of the driver's road habits, and particularly will show whether he uses his head in accidents and other emergencies. They will, of course, be a great help to a competent and careful driver if he is improperly accused of responsibility for an accident.

Science News Letter, October 18, 1947

Babies born in the United States today have a life expectancy of 66 years.

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☼ **MOSQUITO EXTERMINATOR**, called a black leaf mosquito-fumer, expels under pressure a killing stream of smoke containing DDT and nicotine into shrubbery and grass when the contents of the container are ignited. Ignition is by a special lighter inserted through a small opening in the top of the container.

Science News Letter, October 18, 1947

☼ **ANTI-WOBLER** device for furniture is a button-size attachment placed under each leg of a chair or table that keeps all legs in contact even on rough floors. The hollow button contains a silicone called "bouncing putty" which automatically, through a connecting piston, adjusts the leg-length.

Science News Letter, October 18, 1947

☼ **ICE CREEPER**, just patented, is a flexible band that fits around the instep of a shoe. The part under the sole has metal strips on its lower side adapted to grip the ice, and an upper surface adapted to be indented into the sole of the shoe.

Science News Letter, October 18, 1947

☼ **WHISKBROOMS** with plastic fiber bristles instead of the familiar straw are effective in removing dust, lint and hair from clothes, and can be washed in soap and warm water without injury. Their handles are also made of plastic and both handles and bristles are in various colors.

Science News Letter, October 18, 1947



☼ **DUST FILTER**, shown in the picture, has an aluminum facepiece, a rubber exhalation valve, and a transparent plastic housing to hold the removable filtering material. Air is inhaled through four openings in the lid, and the condition of the filter can be noted through the plastic covering.

Science News Letter, October 18, 1947

☼ **THREAD MAGAZINE** for the seamstress is a frame with axles to hold spools of thread whose loose ends are passed through a fabric covering. Beside each hole for the thread projecting through the fabric is a color patch to indicate the color of the thread.

Science News Letter, October 18, 1947

☼ **COOKIE CUTTERS**, made of a durable and easily cleaned plastic, form figures from Grimm's fairy tales of Hansel and Gretel. The story itself, plus easy recipes, is printed inside the box cover. The cutters impress the design-character lines on the cookies.

Science News Letter, October 18, 1947

☼ **TRIGGER LOCK**, for hunting rifles, is a felt-lined metal case that fits over the trigger and may be secured in place by a brass-plated lock and key. In the field, unlocked, it can be removed by a flick of a handy release button.

Science News Letter, October 18, 1947

"Lead" pencils contain no metallic lead but a graphite-clay.

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How can candy be made to help control tooth decay? p. 244.

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In what regions of the U. S. is malnutrition prevalent? p. 246.

PSYCHOLOGY

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PUBLIC HEALTH

Is leprosy as dangerous as TB to a community? p. 247.

GIFT

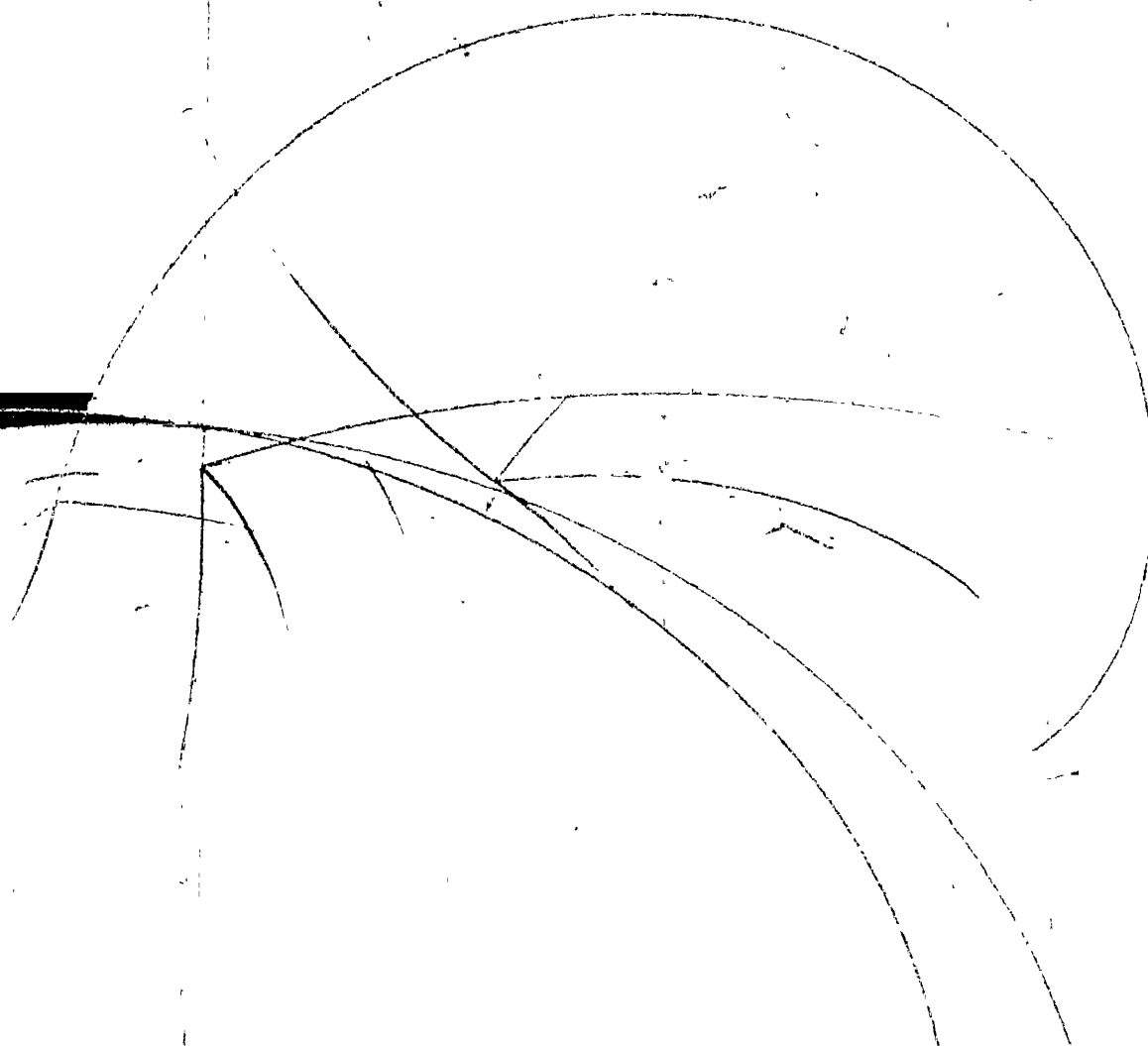
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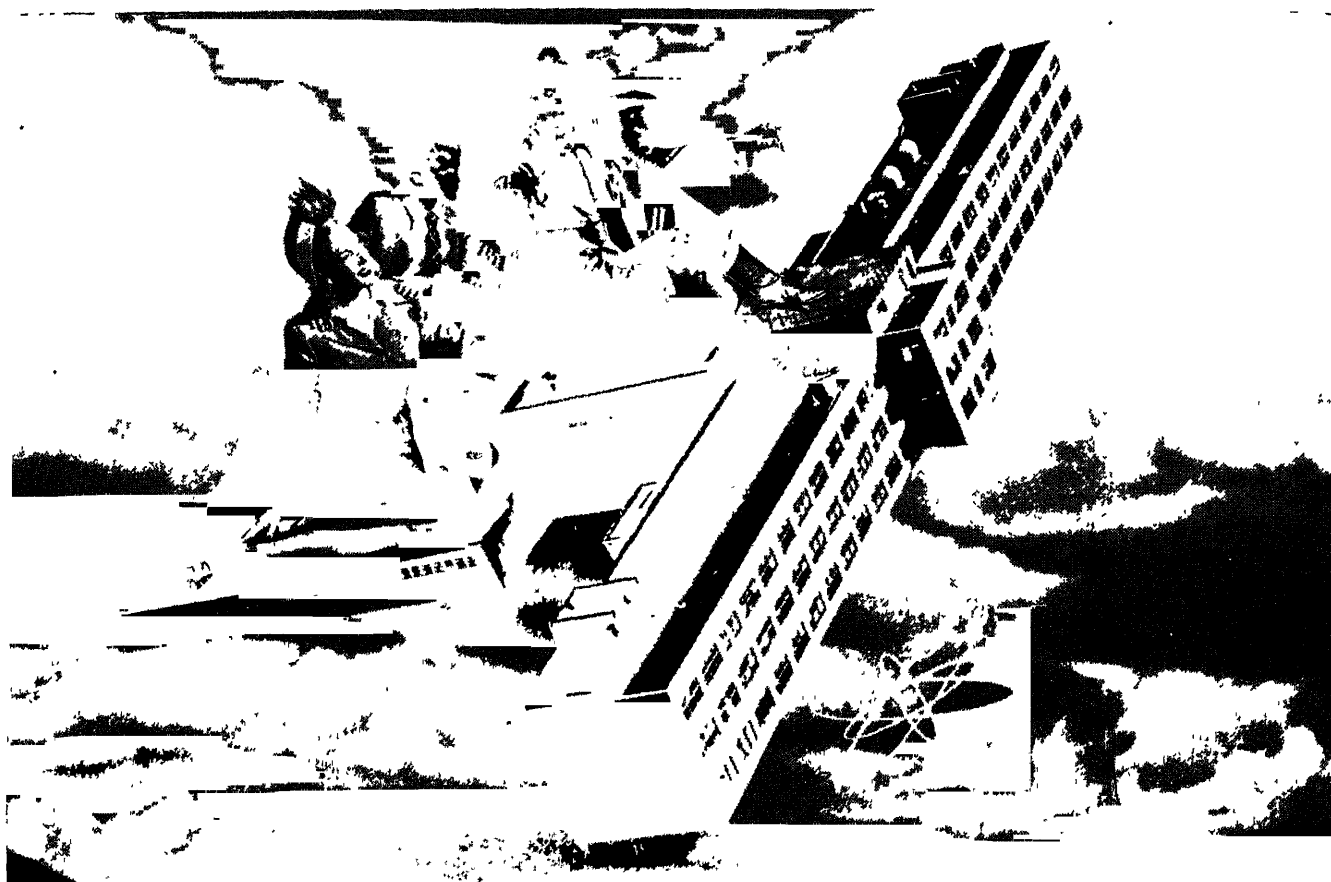
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SCIENCE NEWS LETTER



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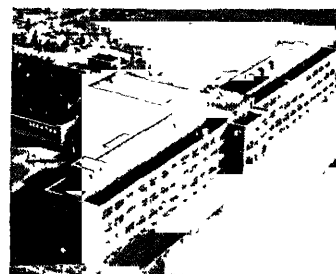
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NUCLEAR PHYSICS

Neutron Becomes Proton

Reverse action is also found in atom nucleus showing how the nucleus is held together by a subnuclear force differing from any known forces.

See Front Cover

► THE neutron (trigger of the atomic bomb) and the proton (heart of the hydrogen atom), both fundamental particles in the nuclei of atoms, can turn one into the other.

This top discovery in man's invasion of the atomic nucleus was announced by Prof. Ernest O. Lawrence, Nobel physicist of the University of California, who delivered the first Silliman lecture of Yale's Centennial Celebration of the Sheffield Scientific School at New Haven, Conn.

This research done with the new giant cyclotron at Berkeley gives direct evidence on the nature of the force that holds the nucleus together. It confirms for the first time a basic theory of atomic forces proposed by the German Dr. Werner Heisenberg in the early 1930's. Dr. Heisenberg headed Nazi atomic energy research during the war.

A new monster atom-smashing "bevatron" to attain 10 billion electron volts was also shown in preliminary design by Prof. Lawrence.

This Heisenberg theory, now confirmed, explained an anomaly of the nucleus. The elementary particles of the nucleus are protons, with a positive electrical charge, and neutrons, with no charge. If electrical laws alone were considered, the nucleus could not exist because protons would repel each other so forcibly when packed together in the nucleus that the atom would disintegrate.

Exchange Forces in Nucleus

Dr. Heisenberg proposed that, in addition to ordinary forces, there are "exchange forces" acting within the nucleus. For example, the charge on the proton, the theory holds, is tossed back and forth between the proton and neutrons, creating a subnuclear force differing from any known forces.

Prof. Lawrence said experiments at Berkeley proving this to be true were done by Drs. B. J. Moyer, J. Hadley, C. E. Leith, Harvey York and Wilson Powell. Interpretation of the results was done largely by Prof. Robert Serber and

the theoretical staff of the Radiation Laboratory.

Two types of experiments were done, using the 100-million electron volt neutrons which are emitted from a target of beryllium bombarded by 200-million electron volt deuterons, the nuclei of heavy hydrogen atoms.

In the first experiment, the high energy neutrons were turned on a target of paraffin, which contains many atoms of hydrogen, the simplest of all nuclei, consisting of one proton.

Like Billiard Ball Collision

Prof. Lawrence likened this situation to a billiard ball collision. He said that the frequency with which the "cue ball" neutrons would strike the target protons a glancing blow and then continue at a slight angle in the same general direction can be calculated according to the laws of probability.

At varying angles away from the paraffin target a series of four radiation counters were placed, weak radiations being filtered out by the first three counters.

It was found that high energy protons were being emitted where ordinary mechanical laws would dictate that only neutrons could be.

The conclusion, Prof. Lawrence said, is that the neutrons, in the collisions, had picked up the charge of the protons. In Jekyll-and-Hyde fashion, the neutrons had become protons and the protons neutrons.

Cloud chamber photographs taken by Dr. Powell revealed the same thing. Neutrons cannot be photographed in a cloud chamber, but protons can. Protons suddenly starting up in the photographs took the same pattern of angles from the direction of neutron beam as they did in the other experiment. Thus it was concluded that the bombarding neutrons had been converted into protons in an exchange of charge.

The pictorial record of the latest advance in physics, appearing on this week's cover of the SCIENCE NEWS LETTER, is a cloud chamber photograph showing the disintegration of carbon and oxygen



MELTED BY RADIO—The investigator shown is measuring the temperature of thorium with a pyrometer while radio waves bombard it in a tubular high frequency melting chamber of the Westinghouse Lamp Research Laboratories. Thorium powder fuses at 3,600 degrees Fahrenheit.

nuclei and the conversion of neutrons into protons under bombardment of 100 million electron volt neutrons from the giant University of California cyclotron.

Direction of the neutron beam is indicated by the arrow. Four "stars," the disintegrations of nuclei similar to those found in cosmic rays, are lined up in a row from a point directly to the right of the arrow to the right of the picture. The heavy tracks are made by alpha particles and protons emitted from the disintegrations. The long curving track is a 1.8 million electron volt proton.

Conversion of a neutron into a proton, demonstrated for the first time, is seen in three short tracks first just above the right of the arrow; second, halfway between the second and third "stars"; and third, just to the right of the third star and crossing one of the tracks of that star.

Curvature of the tracks was produced by a magnetic field of 13,000 gauss.

For 15 years scientists have been trying unsuccessfully to prove Heisenberg's hypothesis. Low-energy cyclotrons did not give collision phenomena of sharp enough definition for conclusive proof.

Billions of Electron Volts

Prof. Lawrence said that the "bevatron" would have a magnet weighing 13,000 tons, and that its source of protons would be a Van de Graaff generator.

"Developments in atomic physics have been and are continuing to be so rapid and so fundamental in character as to

constitute truly a revolution in our understanding of the properties of matter," Prof. Lawrence said.

"We see that the production in the laboratory of accelerated particles in the 100 million electron volt range has opened up a rich domain for investigation. Perhaps, therefore, we should now be content to devote all our attention to the experimental attack on the problems in this field. But the very richness of the atomic phenomena already apparent in the 100 million electron volt level surely beckons us on to green pastures—the domain of billions of electron volts.

"It is, therefore, understandable that as soon as the synchrocyclotron was well

launched on its operating career, W. M. Brobeck, who was chiefly responsible for the engineering design of the great machine, should give some thought to the next step up the energy scale.

"It did not take him long to reach the conclusion that it was well within the realm of practical feasibility to construct a great proton accelerator for the 10 billion electron volt level. Indeed, he has already completed preliminary engineering designs."

Prof. Lawrence did not indicate any immediate plans for the machine's construction.

Science News Letter, October 25, 1947

For other news from the Sheffield Centennial see pages 261, 262, 264.

PUBLIC HEALTH

War on Cholera Mapped

Quarantine experts, who just met in Geneva, planned strategy to stop cholera in Egypt and wipe out this disease, if possible, to prevent future outbreaks.

► IMMEDIATELY needed in Egypt's fight against cholera are 100 more ambulances to transport patients and suspected cholera victims to hospitals, Dr. Mohamed Nasir Bey, undersecretary of state for quarantine, Ministry of Health, Alexandria, reported to the World Health Organization's special committee on quarantine which met in Geneva.

The cholera epidemic in Egypt is essentially limited to rural areas, and rigorous control measures are being taken to prevent its further spread, Dr. Bey reported.

Measures to prevent importation of cholera into countries connected with Egypt by land, sea and air already taken by those countries are more rigorous, the WHO committee found to its surprise, than those recommended by international sanitary conventions and even more rigorous than the situation apparently calls for.

With hospitals in Egypt under virtual military control and travel there limited to official business, the world's chiefs of staff for epidemic control met to map further strategy in the war on this disease.

They had really two fights to plan. One is the immediate battle to stop cholera in Egypt and keep it from spreading to other parts of the world. The other is the war to wipe out this enemy, if possible, so there will be no future outbreaks to endanger world health. This

war will be a long one, since it must involve improvements in sanitation in many parts of the world.

The possibility of cholera spreading to Palestine to add to that land's troubles is believed remote. So far, no cholera has been reported to the World Health Organization from either Palestine or Saudi Arabia.

Reason for Egypt's military control over hospitals is to keep patients from leaving while they may still be discharging cholera germs in their body wastes. Steps must also be taken to find cholera carriers outside of hospitals and bring them under control.

Guards have been posted, as well as placards, to keep people from using water supplies that have been found contaminated with cholera germs.

Part of the million units of cholera vaccine being made available by China will be flown to Saudi Arabia. It will be used to vaccinate the local population in and near Jidda, seaport where thousands of Moslem pilgrims converge during their trips to Mecca and other Holy cities in Arabia. The pilgrims are required to take cholera vaccination and other health safeguards before they are permitted to leave their homelands on these pilgrimages.

U. S. foreign quarantine regulations to prevent cholera getting into this country from abroad require that boats and planes take certain precautions before

departure and while en route from regions where cholera exists. Not only must passengers be vaccinated, but luggage and any other articles shipped on the boat or plane must be inspected to make sure they are not contaminated. Sterilization of such articles may be required. Food and water supplies for the trip must be safe and food handlers must be instructed in proper precautions to avoid contamination. In case of doubt, water must be boiled and all food cooked. On arrival in this country, Public Health Service officers take over. They make sure that no case of cholera is aboard and that all have been vaccinated. If there is a case aboard, passengers and crew are held in quarantine for five days. This is the time it takes for cholera to develop.

Science News Letter, October 25, 1947

SCIENCE NEWS LETTER

Vol. 52 OCTOBER 25, 1947 No. 17

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 398 7th Ave., N.Y.C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439.

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NUCLEAR PHYSICS

Hope To Detect Bomb Test

Study of radioactive clouds offers promise that American investigators may be able to detect the test explosion of an atom bomb in other parts of the world.

► IF SOVIET scientists have figured out a way to make atom bombs, would they be able to carry out the necessary single test explosion without our knowing it?

Assuming, as some Americans do, that the USSR will immediately attack the United States as soon as the Red Army has this most powerful of all weapons, Russian leaders would hardly be so reckless as to launch such a surprise assault without first making at least one test, just as we used up the first bomb built in the New Mexico test before we ventured to drop the next two on Hiroshima and Nagasaki.

This is because of the unique nature of the atom bomb. It does not explode because a primer and booster charge are fired in a mass of uranium 235 or plutonium. Atomic explosions take place when the amount of either of these fissionable elements in one chunk reaches a point where their spontaneous breakdown, or fission, produces neutrons sufficient to produce an almost instantaneous chain reaction. This spontaneously exploding quantity of the bomb element is called its critical mass.

An atom bomb is made by taking two chunks of uranium 235 or plutonium, each less than the critical mass, and suddenly thrusting them together into one mass that is above this critical explosion point. The mechanism of an atom bomb must therefore be quite different from that of an ordinary TNT bomb; and that is why the Russians would have to make a test if they succeeded in producing a bomb of their own.

They might do as we did during the war: make all preparations with the greatest secrecy, not tell anyone when or where the test was made, and trust that the effects could never be detected. But we had the advantage then of almost total unpreparedness by even our enemies for such a test. With all the world shivering in fear of the possibility of a new war, such relatively easy secrecy will not be attainable.

On the other hand, Russia diplomats and military men might attempt to run a colossal bluff: tell the world boldly that they possessed an atom bomb and

had made the necessary test.

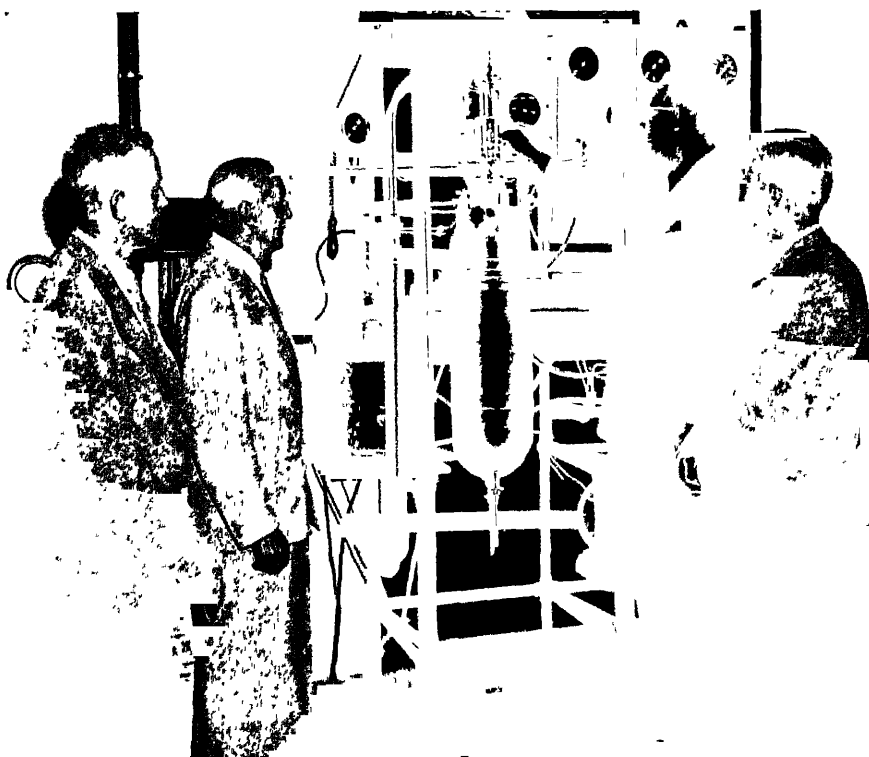
Is there any way for outsiders to get at the facts, in spite of the security precautions which the Soviet leaders could naturally be expected to take in their own interest?

Disregarding possible use of "orthodox" methods of espionage, what are the scientific methods that might be used to detect a test explosion of an atom-bomb a long way off?

Principal methods suggested are three: seismic, or check on the earthquake-like waves in the earth started by such a giant explosion; microbarographic, or detection of a pressure-wave in the air; radiometric, or spotting of the spreading cloud of atomic fragments by their electrical charges.

Least promising, probably, is the seismic method. True, the jar of the Alamogordo test was detected by a few earthquake observatories, but these were less than 300 miles away; more remote instruments, even in the United States, showed no trace of it. Neither did the underwater explosion at Bikini record itself on any seismographs except those especially installed on the atoll itself.

Use of the microbarograph, which is an instrument built to record exceedingly minute changes in air pressure, does not look much more promising. True again, such an instrument in England did record the fall of a great meteorite in Siberia in 1908. However, this immense missile from outer space released more destructive energy than a hundred or more atom bombs all at the same place in the same instant. If Soviet scientists were to explode a mere single atom bomb in the same place (which would be a pretty good one for the purpose) or in the deserts of southwestern Asia (which might be better) it is rather unlikely that its pressure-wave would be detectable by microbarographs outside the boundaries of the USSR.



LIQUID HELIUM MACHINE—Being examined in the Sloane Physics Laboratory at Yale, where temperatures approaching absolute zero have been reached, by, left to right: William W. Watson, chairman of the Yale Physics Department; President Charles Seymour of Yale; Cecil T. Lane, associate professor of physics in charge of liquid helium experimentation; and Edmund W. Sinnott, director of the Sheffield Scientific School and the University Division of Sciences.

That leaves the possibility of learning that an atom bomb explosion has taken place by electroscopes — highly sensitive instruments that can detect the impact of even one electrically charged particle, and would be certain to show the passing of a big cloud of them, such as made up much of the ominous mushroom-shaped clouds that rose over Alamo-gordo, Hiroshima, Nagasaki and Bikini.

These clouds dissipated, became invisibly thin; yet myriads of charged particles remained relatively close together, as compared with the sparse scattering of such particles that are normally present in the air all the time. The critical question is: Would the cloud still be thick enough, after drifting half-way around the world, to be recognized by these means?

Testimony is conflicting. After "Able" day at Bikini, the most nearly comparable test, so far as distance is concerned, several operators of such instruments, notably in California, Oklahoma and Texas, reported finding traces of the drifting charged cloud in their records. Other observers denied this; and their numbers included some of the world's leading physicists in parts of the world as widely separated as the United States, Peru and Australia.

There is one additional piece of negative evidence. In May, 1946, 40 days after the New Mexico test explosion, the Eastman Kodak Company had some X-ray film fogged by contact with strawboard that had become radioactive, presumably as a result of contamination by the northeastward-drifting cloud of atomic debris; either the straw used as raw material or the water used in processing had been affected. Carefully prepared "atom-traps" of cotton were exposed for 60 days after the first Bikini blast at various points in the United States and over the Pacific area as far out as Manila and Melbourne. Measurement of radioactivity "showed such low values as to be without definite significance as to dissemination of radioactive dust" from Bikini.

Distribution of the places where these tests were made, both electroscopic and photographic, was haphazard rather than scientifically planned. Observers simply checked up on their electroscopes wherever their laboratories happened to be; the cotton "atom-traps" were merely distributed to the principal Eastman branch offices, with instructions for their quite simple operation. If a systematic study had been undertaken of the possibility of recording a long-range drift of the radioactive cloud fragments, there would

have been more observatories, preferably on mountaintops, on the Pacific coasts of North and South America, and probably some in the East Indies, the Philippines and Japan, but fewer at inland points.

Moreover, it is probable that for making a special test of the atmosphere, to find out if anybody has been setting off atom bombs secretly, a type of instrument somewhat different from existing electroscopes might be desirable. Certainly arrangements would be made to send lightweight instruments aloft by plane or free balloon, with robot radio sets to signal back to earth what they might find in the upper atmosphere.

If we want to sniff the stratospheric air for radioactive evidence of possible

secret Soviet bomb tests, the likeliest places for high-altitude ground observatories, as well as for radio-robot balloon launching stations, would seem to be central and northern Japan, the Aleutians, and mainland Alaska. That is where winds blowing out of Russian Asia first flow over American-controlled land.

Would instruments so used tell of an atom-bomb explosion somewhere in interior Asia? On the basis of the conflicting evidence here reviewed, the answer cannot be better than "maybe." And if the U. S. Department of National Defense has better instruments and more advanced plans, naturally they aren't telling.

Science News Letter, October 25, 1947

CHEMISTRY

New Germ-Fighting Drugs

Scientists are beginning to understand "chemical kinetics," which promise to allow them to design and then to build substances that will block bacterial growth.

➤ NEW disease-fighting chemicals, tailor-made by scientists out of the cloth of more detailed knowledge of the structure of living matter, will result from the researches that Dr. Linus C. Pauling, California Institute of Technology chemist, described in his Silliman lecture at New Haven, Conn. as a part of the centennial of Yale's Sheffield Scientific School.

"Whether a drug will successfully combat an invading germ is largely dependent upon whether the drug can be made more attractive to the germ than the living cell being attacked.

Dr. Pauling, digging into the matter of the molecules involved, finds that the antigen (the germ factor) and the antibody (the germ-fighting factor) interact with each other because they fit into each other in structure. A large portion of the surface of one can be brought into juxtaposition with the surface of the other molecule. Such closeness allows the weak forces operating between them to create an effective bond. Thus the drug can counteract the germ.

The exciting thing about this scientific research is that the scientists have the beginnings of knowledge of what is called "chemical kinetics" which promise to allow them to design and then to build chemical substances that will block the activities of bacterial and virus growth. Years may elapse between the fundamental research and the appli-

cation to actual sick people but the way to success seems to have been found.

The nature of living matter itself is being better understood. Dr. Pauling explained that a substance called a catalytic enzyme allows the living cell to carry out any specific reactions that don't take place when the chemicals are just mixed together.

Bacteria are themselves living organisms and the scientific attack upon them is planned as an attempt to find a chemical molecule that will inhibit the particular enzyme that is necessary to growth of each kind of germ. This means that the chemists will have to build kinds of chemicals that resemble bacterial enzymes so closely that they join with them and put them out of business.

Disease fighting in a fundamental long-time sense has thus become a matter of delving into the molecular structure of substances, a research that at first blush might be considered far removed from curing the ill and fighting death.

Science News Letter, October 25, 1947

An alloy of iron and cerium is the so-called *flint* usually used in cigarette lighters.

In *muskrat farming*, ditches are sometimes dug in marshes to provide deeper water for the animals during winter weather; the ditches have no outlets.

PHYSICS

One Hearing Aid for All

Experts discovered from war research that a hearing aid can be made to suit almost all deafened persons. They will no longer have to be individually prescribed.

► CONTRARY to the present idea that hearing aids must be individually prescribed like eyeglasses, scientists at Harvard University have discovered that one hearing aid can be made which will suit almost all deafened persons.

Specifications for the "Master Hearing Aid", developed from war research on noise and communications, appear in a report, "Hearing Aids: An Experimental Study in Design Objectives," published by Harvard University Press.

"It is only a matter of time and continued research," says Dr. S. Smith Stevens, director of the Harvard Psycho-Acoustic Laboratory, "before a hearing aid is available which will meet all the demands imposed by most deafened ears. And with the improved fidelity in amplification will come new lightness, ruggedness and general economy."

The specifications proposed for the ideal hearing aid are:

(a) An overall acoustic frequency which is uniform and without sharp peaks or valleys. The lower cut-off frequency should be not higher than 400 cycles per second (cps) or lower than 200 cps. This frequency roughly approximates the pitch of middle "C" on the piano. The higher frequency cut-off should not be lower than 3000 cps and can extend to 4000 cps. This latter frequency corresponds to four octaves above middle "C" on the piano.

(b) Between the cut-off frequencies of 300 cps and 4000 cps the overall slope of the frequency characteristic of microphone and earphone should rise toward the higher frequencies with a slope of 3 or 4 decibels per octave. A decibel is explained as a logarithmic unit of sound intensity. For instance, an airplane engine has an intensity of about 120 decibels while the buzz and hum in the average office is around 40 decibels.

(c) Maximum acoustic output should be limited so that the ear is protected against discomfort, pain or possible injury from powerful transients.

(d) The instrument must be sufficiently sensitive and free from electrical or other internally generated noise to allow it to render intelligible to a normal ear speech delivered to the instrument

at a level not more than 10 db above the unaided threshold of intelligibility of that same normal ear.

(e) Acoustic gain (amplification) varies so widely that it is probably desirable to design at least two or perhaps three different models of hearing aids.

(f) The instrument must be provided with an effective gain control with a range of at least 40 db.

(g) There must be no squeal (electrical feedback) when the instrument is operated at maximum gain setting.

Supervisor of the research project was Dr. Hallowell Davis, former associate professor of physiology at Harvard and now director of research at the Central Institute for the Deaf, St. Louis; Dr. Stevens, and Dr. R. H. Nichols, associate director of the Harvard Electro-Acoustic Laboratory

Science News Letter, October 25, 1947

PALEONTOLOGY

Beetle 8,000,000 Years Old Entombed in Amber

► SOMETHING over 8,000,000 years ago a long-snouted beetle very much like a modern pine weevil wandered over the bark of an evergreen tree in the Baltic flat-woods. It blundered onto an ooze of sticky gum, bogged down, and

perished. The gum hardened into rosin, dropped off (perhaps during a rain-storm), was washed downstream and deeply buried in silt.

Ages later, East Prussian miners dug up the lump, now hardened into amber but still holding its entombed beetle, from a pit 90 feet deep. It was sent as a curiosity to Dr. Titus Ulke, veteran Washington, D. C., naturalist.

With L. L. Buchanan, U. S. Department of Agriculture entomologist, Dr. Ulke regarded the specimen with something more than curiosity. For the embedded weevil, though it resembled present-day insects in the genus *Pissodes*, was sufficiently different to be considered a distinct genus—something new under the sun of science. So Dr. Ulke gave it a new zoological name, *Paleopissodes weigangae*. The specimen is now in the Academy of Natural Sciences.

Science News Letter, October 25, 1947

ASTROPHYSICS

Sea-Level Observatory to Measure Sun's Radiation

► TO measure the effect of the lowermost and most humid layer of the earth's atmosphere on radiation coming through from the sun, the Smithsonian Institution is establishing a new astrophysical observatory at Miami, Fla.

Readings taken there will be compared with those from the Institution's already existing astrophysical laboratories, which are on high, dry mountaintops—one on Table Mountain in California, the other on Mount Montezuma in Chile. A site in Mexico is now being sought for a third.

Science News Letter, October 25, 1947



ENTOMBED BEETLE—An 8,000,000-year-old beetle found in a piece of amber uncovered by East Prussian miners. It is new to modern science. The photograph is considerably enlarged.

MEDICINE

Gene Theory Dims Cancer Conquest Hope

► CONQUEST of cancer is one of the most hopeless problems of science if the theory proves true that tumor growth is caused by changes in the form of the genes, which are the irreducible units of living systems.

Dr. George W. Beadle of the California Institute of Technology, in delivering a Silliman lecture at New Haven, Conn., in connection with Yale's Sheffield Scientific School centenary, explained that while the frequency of mutations of the genes can be increased in many ways, there is little immediate hope of decreasing them.

Progress in cancer research is discouragingly slow, he emphasized, although great sums of money are being spent and an impressive array of talent is directed upon this problem. The idea that change in the fundamental living bits that carry heredity is the fundamental cause of cancer is very discouraging and Dr. Beadle feels that makes scientists reluctant to look with favor on the idea.

Radiation from the atomic bomb, X-rays, cosmic rays, and even the ultra-violet light in strong sunshine are all known to be able to cause change in the inheritance of living things, human beings included. Radiations do this by changing the genes. Some of the changes may not show up until scores of generations have lived and died. This is the basis of some of the real fear that some scientists have of the genetic disaster for mankind and other living things contained in the atomic bomb.

Science News Letter, October 25, 1947

ASTROPHYSICS

Sun's Energy Measured By New "Langley" Unit

► WEATHER-MEN and physicists have a new scientific unit for use in measuring the sun's heating power—the "langley", abbreviated as "ly". It is named in honor of Dr. Samuel P. Langley, who was a pioneer student in this field as well as one of the founders of modern aviation. Formal notice of the adoption of the new unit has been given by a group of leading meteorologists and astrophysicists in a communication to the British science journal (*Nature*, Sept. 6).

Curiously enough, the adoption of the "langley" was recommended in a 1911 report of the International Union of Pure and Applied Physics, which was published in the *Proceedings of the International Union of Pure and Applied Physics*, 1911.

buch der Physik, issued in Berlin during 1942, while the Hitler's Reich was at war with the United States. Nazi thought-controllers apparently overlooked that one.

A langley is defined as the amount of solar radiation received on one square centimeter, capable of raising the temperature of one gram of water one degree Centigrade. Phrases like "langleys per minute", abbreviated to ly/min, can be expected to appear in future scientific literature.

Signing the communication that formally sets up the new unit were: Loyal B. Aldrich, director, Astrophysical Observatory, Smithsonian Institution; Harry Wexler, chief, Special Scientific Services, U. S. Weather Bureau; Sigmund Fritz, meteorologist, U. S. Weather Bureau; L. F. Hand, official in charge of solar radiation section, U. S. Weather Bureau; Arnold Court, meteorologist, Office of the Quartermaster General, War Department; Maj. William P. Millen, Air Corps.

All the signers have headquarters in Washington, with the exception of Mr. Hand, who works in Boston.

Science News Letter, October 25, 1947

PSYCHOLOGY

Family Life Determines Character of Child

► LIFE with Father—and the rest of the family—determines the character and personality of Junior, three University of Chicago psychologists discovered in a study of 13-year-old children in a Midwestern town.

Most important part of family life, as far as building junior's character goes, is his sharing in family decisions. Next most important are the attitudes of the parents toward each other and their attitude toward the child's relations with his peers.

These findings are reported by Andrew W. Brown, Joan Morrison and Gertrude B. Couch in the *Journal of Abnormal and Social Psychology* (Oct.). Their work is a part of a study being conducted by the Committee on Human Development of the University of Chicago in a "typical small Midwestern town," referred to as "Prairie City."

A group of school children answered questions about their family relationships, while teachers, other adult leaders and the pupil's schoolmates rated their character in different tests.

Among ten phases of family life, sharing in decisions ranked highest in relation to character, but all ten were found to be a part of character-building.

Science News Letter, October 25, 1947

IN SCIENCE

OPHTHALMOLOGY

One Donated Eye Gives Normal Sight to Two Boys

► A WAY to make two eyes see again for two boys through a single gift eye from a third person was described by Dr. George P. Landegger of Los Angeles at the meeting of the American Academy of Ophthalmology and Otolaryngology, in Chicago.

A rectangular piece of cornea, transparent part of the eye that admits light, was cut from a donor eye and divided in half. One of the squares thus formed was grafted into the eye of one boy and the other into the eye of another boy, each of whom had such advanced deformity of the corneas of their own eyes that not even contact glasses could help them to see.

The grafts healed perfectly and 11 months after the operation each boy had normal 20/20 vision.

Science News Letter, October 25, 1947

MEDICINE

Hope to Prolong Action of Penicillin with Metals

► PENICILLIN may be made more useful as a remedy by combining it with metals or with various organic dyes, Samuel Monash of New York suggests in a report to the journal, *Science*, (Oct. 17).

The greater usefulness would come from the fact that the mold remedy would stay in the blood longer when combined with a metal or a dye.

Metals inactivate penicillin, other scientists have previously reported. But Dr. Monash thought the inactivated penicillin might become active again after it gets into the body.

He tried it on rabbits. Penicillin in peanut oil, material generally used to slow penicillin escape from the body, could not be found in the rabbit's blood five hours after it had been injected. Penicillin combined with silver, mercury or iron could be detected in the rabbit's blood from 17 to 20 hours after injection. Much the same results were obtained when penicillin was combined with the dyes, brilliant green and gentian violet.

Science News Letter, October 25, 1947

E FIELDS

NUCLEAR PHYSICS

New Atomic Study Launched With Mass Spectrograph

➤ A NEW attack on secrets of the atom by researchers at the National Bureau of Standards in Washington may reveal whether man can unlock energy from other atoms than ones of the atomic bomb elements.

"A large new instrument of novel design" is planned "to indicate available atomic energy," the Bureau of Standards announced. This instrument will be a mass spectrograph. Being built at the Bureau in cooperation with the Office of Naval Research, the new instrument will give precise determinations of atomic masses.

The new spectrograph will be so sensitive that it will measure the mass of the particles which make up atoms. Measured with the new instrument, these subatomic masses may solve some of the mysteries of the structure of atoms—and give new hints on where and how to unlock the energy in other atoms.

This new tool for atomic scientists is one job of a new atomic physics division being established at the Bureau. The six sections of the division will do fundamental research and set standards in atomic fields.

Dr. E. U. Condon, director of the Bureau, also will head the new division with Dr. Robert D. Huntoon, a Bureau scientist who worked on the radio proximity fuze, as assistant chief.

Science News Letter, October 25, 1947

OTOLOGY

Pure Lead Used to Keep Ear Window from Closing

➤ THE famous window cutting operation on deaf ears to let them hear again has been improved by a lead burnishing.

This new development in the fight against deafness was announced at the meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago by Dr. Julius Lempert, New York ear specialist and surgeon who was one of the first to perform this operation in the United States.

The operation itself consists essentially in making a new window in the inner ear for the passage of sound waves.

It is used in cases in which hearing is lost because of bone formation in the opening to the ear. This bone formation prevents the passage of sound waves to the nerve of hearing.

One drawback of the operation is the difficulty of keeping the new window open permanently. Covering the opening with a flap of scar tissue from the ear canal has been one method used.

Dr. Lempert's innovation is to burnish the rim of the new window with pure lead. When tried in monkeys, this prevented formation of bone, which would close the window again. He hopes that it will do the same in humans.

Science News Letter, October 25, 1947

MEDICINE

Stomach Cancer in Mice May Help Human Diagnosis

➤ CANCER of the stomach, which is the most frequent and highly fatal form of the disease in men, can now be experimentally produced in mice.

Confidence that this will lead to a better understanding of the disease in man and perhaps shed some light that will enable investigators to detect cancer of the stomach in its early stage was expressed by Dr. Harold L. Stewart of the National Cancer Institute, Bethesda, Md., who with Dr. Egon Lorenz reported his work to the International Cancer Research Congress.

Two powerful cancer-producing chemicals have been used to cause stomach cancer in the laboratory mice. But, whereas small injections of these chemicals are almost certain to produce cancer in four months, when given by mouth they have no effect on the glandular stomach. Mice were fed a dose of 20-methylcholanthrene, 350,000 times as high as that required to produce cancer by subcutaneous injection with this powerful chemical, without developing the disease. This again may be significant to man because suspicion has centered in the past on what was taken by mouth as a cause for the high rate of cancer in men.

Further studies will be made in an attempt to produce cancer in all strains of mice, to find a strain that is resistant to cancer and discover if possible what causes the resistance. The cells involved in the production of cancer will undergo intensive study and smears will be made of the cells shed in an attempt to discover a method for early detection.

Science News Letter, October 25, 1947

MEDICINE

New Blood Test to Aid in Treatment of Infections

➤ A NEW blood test that will help doctors give better treatment with penicillin or other drugs to patients suffering serious infections has been developed by Dr. Charles H. Rammelkamp, Jr., and Miss Margaret Hezebicks of Western Reserve School of Medicine, Cleveland, Ohio.

The test is for the staphylococcus, germ that causes boils but also such serious ailments as abscesses of the liver and kidneys, pneumonia, and osteomyelitis, or bone inflammation. If the doctor knows what germ is causing the trouble, he can tell better what medicine to give.

To make the test, a sample of the patient's blood serum is taken. To this is added a substance called coagulase, which comes from cultures of the staphylococcus germ. This is incubated and then fibrinogen, blood chemical that plays a part in making blood clot, is added. If there is no clotting, it shows that the patient has become infected with the staphylococcus.

Science News Letter, October 25, 1947

INVENTION

Car-Lifting Elevator Parks Autos Automatically

➤ PARKING six or eight cars where but one could be parked before is the alluring prospect held out by a Los Angeles inventor, Richard L. Sinclair, on whose automatic parking apparatus U.S. patent 2,428,856 has just been issued.

The apparatus consists of a car-lifting elevator which will carry a car driven onto its channelled tracks up to the level of an overhead stall. When it is opposite the stall entrance, the tracks slide out, carrying the car into the stall; then they slip out from under the wheels, leaving the car parked.

In its simplest form, the parking machine serves only two ranks of stalls. However, it is possible to increase the number by building the elevator tracks on a turntable, so that cars can be parked in radially arranged stalls, more or less like an old-time railroad roundhouse.

All operations are carried out by hydraulic mechanism, with electric controls centered at a single operator's station. Rights in the patent are assigned to Park-O-Mat, Inc., of Los Angeles.

Science News Letter, October 25, 1947

ASTRONOMY

No Planets in Evening

But there will be plenty of bright stars during November evenings. The "Great Square," high in the south, is a good group with which to find the fall constellations.

By JAMES STOKLEY

► WHILE NO PLANETS are easily visible through the evening in November, there are plenty of bright stars to repay a study of the skies; and if you happen to be around in the early morning hours, some planets come into view. On the accompanying maps are depicted the appearance of the heavens at about 10:00 p.m., your local brand of standard time, at the first of the month. In the middle of November they will look the same way an hour earlier.

A good group with which to start finding the autumn constellations is that marked "Great Square," high in the south, part of Pegasus, the winged horse. Extending from the upper left hand corner of the square directly overhead is Andromeda, the chained lady. Below and to the left of the square one sees Pisces, the fishes; and below this is Cetus, the whale. To the right of these figures is Aquarius, the water carrier, and below this another fish is found—Piscis Austrinus, the southern fish, with the bright star Fomalhaut.

Bright November Stars

The brightest stars of the November evening skies, however, are found in two groups, one to the east and the other to the west. Just above the eastern horizon Orion, the warrior, is coming into view. First magnitude Betelgeuse is to the north, and Rigel to the south, of the three stars in a vertical row that mark his belt. Above Orion we find Taurus, the bull, with brilliant Aldebaran, red in color. About the same height in the east, and farther to the left, is Auriga, the charioteer, with Capella. Below this is Gemini, the twins, with Pollux as the brightest star.

In the northwest shines the northern cross, part of Cygnus, the swan, and with Deneb, another star of the first magnitude, at the top of the cross. Below it is Lyra, the lyre, with Vega, and to the left you will find Aquila, the eagle, with Altair.

At the beginning of the month the

planet Venus will be too nearly in line with the sun to be visible, but by the end it will shine just above the southwestern horizon at sunset. During the later fall and winter it will become a most brilliant object in the western evening sky. Jupiter, which makes a close approach to Venus on Nov. 9, is also low in the southwest at sunset, and hard to locate, since it is fainter than Venus. Mercury is on the western side of the sun, so that it comes up in the east just before sunrise, and may be glimpsed at dawn low in the southeast.

Mars and Saturn

Mars and Saturn arise in the east about midnight, in the constellation of Leo, near the star Regulus. They are in that order from west to east and about equally spaced. The order will change during November, for on the 11th Mars passes within a degree to the north of Saturn, and on the 28th within two degrees of Regulus. The three objects can easily be identified by remembering that Saturn is the brightest, Regulus the faintest, while Mars is distinctly red in color.

On the night of Nov. 16 this same part of the sky—the constellation of Leo, the Lion—will be a center of interest for from it will seem to emerge the meteors of the Leonid shower. Actually these meteors, or shooting stars, are bits of cosmic dust, moving through

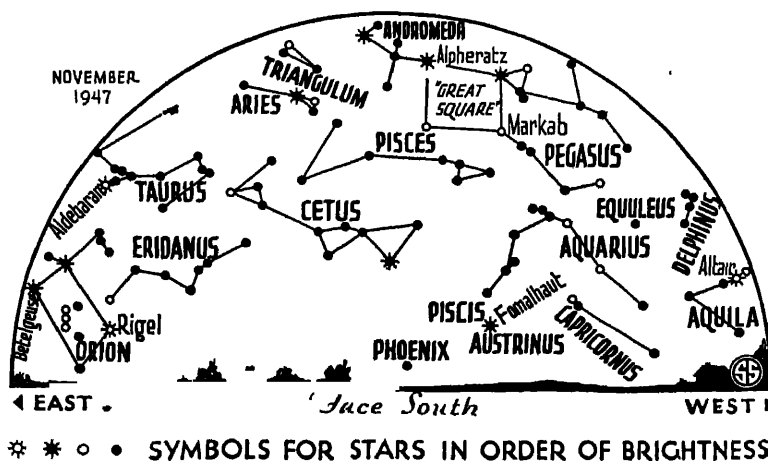
space in parallel paths. Like the tracks of a railroad, these seem to converge in the distance, towards Leo. More of these meteors will be seen after midnight than before, and perhaps one a minute will be visible when the shower is at its height. Of course, these are not stars at all, but tiny particles which enter the earth's atmosphere and disappear as they are burned up in a flash of light.

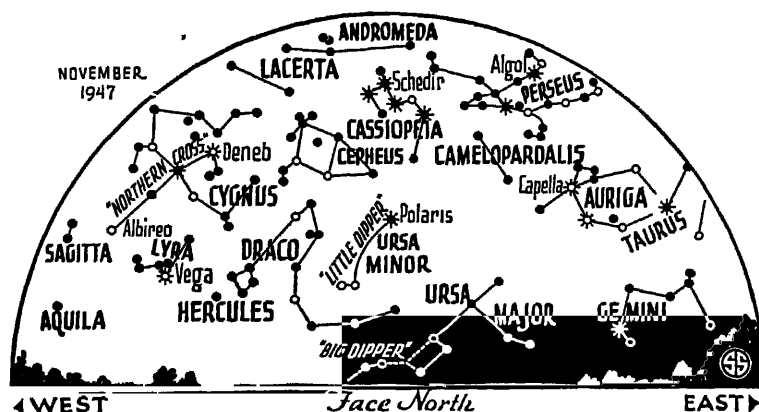
Eclipse of Sun

On Nov. 12 the second eclipse of the sun this year will occur, and unlike the first, on May 20, something of it will be seen in most of the United States. The earlier eclipse was of more scientific interest, however, for it was total. Then the moon's shadow swept across the earth along a track crossing South America, the Atlantic Ocean and Africa. Many scientists travelled to points along the path, and there the sun's disk was completely hidden by the moon, making possible many observations not feasible at other times.

The moon will be relatively farther away on eclipse day, Nov. 12, than it was in May, and it will look a little smaller—too small, in fact, to cover the sun completely. Thus there will not be a total eclipse even in places on the earth directly in line with the centers of the sun and moon. When the eclipse is at its height at these points, the dark disk of the moon will be visible with a ring of the sun's edge around it. Such an event is called an "annular" eclipse from the Latin word for a ring.

The narrow path along which the annular effect will be visible crosses the





Pacific Ocean to the coast of Peru and then ends in the jungle of Brazil. But over a much larger area one edge of the sun will be covered by the moon, and there a partial eclipse will occur.

The region of the partial eclipse covers the northern part of South America, except the extreme eastern part of Brazil; all of Central America; most of the United States and the western part of Canada. The only part of the United States where it will not be visible is that north of a curved line crossing Massachusetts, New York, Pennsylvania, Ohio, Indiana, Illinois and Wisconsin.

California will see the greatest eclipse, with about 40% of the solar diameter being covered in the region of San Diego. Farther north and east the eclipse will be less. At Denver, for example, the coverage will be only 14%. At Atlanta it will be 10%, and at Washington 4%. New York will get only 2% and Chicago 1%, hardly enough to be noted. Watching the sun through some protective screen, such as an exposed piece of

photographic film, possibly a narrow bite will be noted in the sun's edge. The time of the maximum at New York will be 10:48 a.m., EST, and at Chicago 9:21 a.m., CST.

Time Table for November

Nov.	EST	
3	9 00 a.m.	Moon nearest, 229,400 miles
5	2.43 a.m.	Algol (variable star in Perseus) at minimum brightness
	12:03 p.m.	Moon in last quarter
	9 37 p.m.	Moon passes Mars
6	1 40 a.m.	Moon passes Saturn
7	11 32 p.m.	Algol at minimum
9	9 00 a.m.	Venus passes Jupiter
10	8:20 p.m.	Algol at minimum
11	1 00 p.m.	Mars passes Saturn
12	3 01 p.m.	New moon; annular eclipse of sun is visible in Pacific Ocean, partial eclipse visible over most of North America
13	7:39 p.m.	Moon passes Jupiter
14	5 25 a.m.	Moon passes Venus
16	Early morning	Meteors of Leonid shower visible
18	6.00 p.m.	Moon farthest; distance 251,500 miles
20	4:44 p.m.	Moon in first quarter
25	4:25 a.m.	Algol at minimum
28	1:14 a.m.	Algol at minimum
	3.45 a.m.	Full moon
30	1:00 p.m.	Moon nearest; 226,100 miles
	10:03 p.m.	Algol at minimum

Subtract one hour for CST, two hours for MST, and three for PST

Science News Letter, October 25, 1947

ELECTRONICS

Printed Circuit Radios

Eleven-ounce two-way radios from which you can talk for a distance of 10 miles, to be offered public with private frequencies within the 460-470 megacycle range.

► ELEVEN-OUNCE two-way radio with which you can talk to your office or your home from a distance of up to ten miles is ready to go on sale as soon as the Federal Communications Commission sets up a licensing system.

A. Gross, president of Gross Electronics, Inc., Cleveland, showed his new instrument at a symposium in Washington on printed circuits. Flat, "printed" wires and other miniature

parts make possible the new light-weight, civilian "walkie-talkie." Complete with batteries and antenna, the two-way radio is carried in a leather case in the way you carry your camera. Price of the new transmitter and receiver will be "less than \$200 a pair."

They will be sold in pairs which are tuned to their own private frequencies, within the 460-470 megacycle range allotted to personal radios by the FCC. Each set will be licensed by the FCC.

Another manufacturer will have a cigarette-pack-sized radio receiver using printed circuits on the market "in about a month," it was learned at the symposium. A hearing aid with light, compact printed circuits was also shown to the group of scientists.

New uses for printed wire in electronic circuits will range from radar to toys and games, Dr. Cleo Brunetti, engineer at the National Bureau of Standards predicted. Dr. Brunetti demonstrated his own small, printed-wire radios. He has built a transmitter in a lipstick and a radio receiver the size of a calling card.

A military leader, R. J. Framme, Wright Field, Ohio, engineer and member of the military aeronautical board which sponsored the meeting, declared that printed circuits and other rugged miniature parts are "the only thing" that can be used to get the small size and light weight needed for electronic assemblies on guided missiles, automatic aircraft and other military equipment using electronics.

Science News Letter, October 25, 1947

A tall tree close to a house usually, but not always, protects the building from lightning.



SPEEDOMAX Saves Time; Records Data Accurately

At Univ. of Minnesota, a Speedomax records skin temperature of a student eating ice-cream during experiments to determine the effect of food temperature on blood flow. The instrument automatically collects data at six test points every half minute, requires none of the researcher's attention during the course of the test. Experimenters can be supplied with faster or slower Recorders. Write for catalogs, or consult an L&N engineer for specific information.

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Do You Know?

The best *dairy cattle* came originally from Asia, but were developed in the cool climates of Holland, Denmark, Scotland and the Channel islands.

Baled *cotton* in storage can be protected from ordinary sources of ignition by dusting with sodium bicarbonate; when exposed to heat from a spark or lighted match, it liberates carbon dioxide, a fire extinguisher.

Canadian *scientific industrial research* centers in laboratories operated by the Canadian National Research Council; the Council has a full-time civilian staff of about 1,500 persons.

A shield of treated wood is not sufficient protection against *termites*; these wood-destroying pests can build their tunnels across treated wood to reach wood that is unprotected.

MEDICINE

Diseases Strike Unborn

More than 12 per 100,000 of the American population are crippled or killed by diseases that attack them before they are born.

➤ AMERICANS of the future are being killed at the rate of more than 12 per 100,000 population each year by diseases that attack them before they are born, the nation's health fighters, members of the American Public Health Association, were told.

The causes of this loss of life and the crippling among those who survive pre-birth damage are "largely accidental and preventable," Drs. John E. Gordon and Theodore H. Ingalls of the Harvard School of Public Health declared.

The discovery that German measles in the mother during the first three months of pregnancy may cause many different defects in the baby, even blindness, deafness and deformities of the heart, has acted as a veritable ferment in medical research during the past decade. The discovery implied that there is an unfathomed relation between disease in the mothers and defect in the babies.

Many of the structural diseases of the human body may date back to a cause operating years before its full effects show themselves, it is now believed.

The usual preventive methods used by doctors caring for expectant mothers are not enough to insure perfect development. Further evidence for this and for the existence of an unsolved public health problem comes from the fact that about a third of the country's youth was unfit to meet the physical requirements for induction into the armed forces.

Influenza, smallpox, syphilis and typhoid fever as well as German measles have been shown to play an important part as killers of unborn babies. Almost half of one group of expectant mothers who got 'flu during the 1918 epidemic died. Of those who survived, two-thirds lost their babies either before, at or shortly after birth.

Three significant points on the causes of defects in development before birth were stressed by the Harvard scientists. These are: 1. Unrelated agents acting during pregnancy may give rise to the same type of arrest. 2. Different types of defect may be caused by a single agent. 3. The resulting malformation can be expected to be a function of the stage of the unborn baby's development at

which the cause or agent is active.

Two avenues of approach for further study leading to prevention of pre-birth deaths and defects were suggested: 1. search of maternity records to determine the responsible agent which produced a defective birth; 2. observation of pregnant women who have any form of infection and of the effects on the child when born.

Science News Letter, October 25, 1947

FOOD RESOURCES

Precious Meat Supplies Cut by Premature Deaths

➤ MEAT wouldn't be so scarce if so much of it were not allowed to die on the hoof without ever reaching market, headquarters of the American Veterinary Medical Association in Chicago pointed out. One way to increase meat supplies, both for home use and for relief shipment abroad, would be to stage an all-out campaign to stop the needless deaths of so many meat animals, dairy cows and poultry.

One-third of all pigs in this country die before they reach the packing-house, officers of the Association declared. One-fifth of all dairy calves die before they come of milking age. A quarter of all egg-farm pullets never get a chance to lay an egg. Parts of millions of hogs are condemned annually by inspectors because of tuberculosis, and careless shipping of livestock results in an estimated 75 million pounds of lost meat every year.

Science News Letter, October 25, 1947

Expecting?

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Living Fossil

➤ DINOSAURS belong to a past so remote that we are apt to think of them as inhabitants of another and fantastic planet. All the other backboned land animals of their time have vanished with them, and the vertebrate population of the earth has changed a dozen times over between their day and ours.

Yet if we could transport ourselves back into the woods that the later dinosaurs walked through, we would see leaves on many of the trees and other plants that would remind us strongly of "home". There would be things looking for all the world like elms, sycamores, cottonwoods, willows, walnuts, hickories, grapevines, beeches, birches, alders, hazelbrush—the list could be strung out to considerable length. Going even farther back are trees belonging to several conifer groups.

All these would look familiar enough, but there is one tree genus that has survived from that day down to this that

strikes us as almost as much of an oddity, when we first see it, as would a live dinosaur. Presumably because it is now so exotic, the ginkgo looks to most of us like a fossil that has come to life.

Of the several genera and fairly numerous species in the once widespread ginkgo family, only one species, known botanically as *Ginkgo biloba*, is living today. It would probably have perished centuries ago, too, but for the fact that Chinese priests fostered it in their temple grounds. It has now become fairly well distributed as a street and park tree in this country, though it is still not as generally appreciated as it deserves to be.

A ginkgo tree has a somewhat columnar shape when young, becoming bush-

ier as it reaches full size. Its glossy green leaves are wedge-shaped, usually deeply cleft. They turn a beautiful pale-gold hue in autumn. As an ornamental, the ginkgo has only one drawback. Male and female flowers are borne on separate trees, and the large-seeded, plum-like fruits that follow the female blossoms have a thin pulp that reeks like rancid butter. For this reason, only male trees should be planted—if you can be sure of their sex in advance.

A great virtue of the ginkgo is its almost complete freedom from the fungus disease and insect pests that bedevil practically all of our other ornamental trees. Perhaps the last thing that ever wanted to chew its leaves was a herbivorous dinosaur.

Science News Letter, October 25, 1947

OTOLARYNGOLOGY

Metal Throat Saves Girl

➤ A NEW spare part for the human body, an artificial throat made of vitallium metal, was announced by Dr. Sam H. Sanders of Memphis at the meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago.

It was developed for a 10-year-old girl whose throat was almost closed by scar tissue. For months someone had stayed with her to keep her awake day and night because her mother was afraid she would stop breathing and die if allowed to go sound asleep.

After wearing the artificial throat for over seven months and a skin grafting operation, she recovered. Today, four years later, she is a perfectly normal girl with every prospect of a career as a singer. Nose and throat specialists at the meeting heard a record of her soprano voice which won a superior rating in a state high school contest.

The metal throat is technically termed an artificial oropharynx. The oropharynx is that part of the throat, below the soft palate, where the openings from mouth and nose come into the throat.

Scars from burns by caustics such as lye, diphtheria, syphilis and throat infections may close this part of the throat. In the case reported, the trouble started two weeks after her tonsils and adenoids had been removed. The operation was performed by a competent, well trained specialist. The little girl, J. M., was evidently one of those persons who are prone to develop an excessive

amount of scar tissue for no apparent reason.

Since there are others who may have such trouble, Dr. Sanders suggested that the artificial throat may have further usefulness.

The appliance consists essentially of a jointed tube which is attached to the upper teeth and continues down the throat past the constriction. The mouth and throat sections were at first connected by welding a strap, or connecting bar, cast for this purpose, on each side. Later this was replaced with a ball and socket joint to allow free movement of the head in all directions.

The metal throat was used at first to prevent the scar tissue from growing back and drawing the throat together. Before the appliance was developed, this scar tissue had been repeatedly cut out but always grew back rapidly.

After the appliance had been worn by the girl for seven months, it was removed and a piece of skin from her thigh was applied by collodion to sponge rubber glued to the vitallium tube. This was again inserted in the girl's throat. Two weeks later when the appliance was removed the graft had taken and there was a nice large opening in the throat. With the graft in the throat, there was no chance for scar tissue to grow over and close it.

Dr. O. H. King, a dentist, E. A. Denton, a dental technician, and Dr. Milton Adams, plastic surgeon, assisted Dr. Sanders in developing the metal throat and placing the skin graft.

Science News Letter, October 25, 1947

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HAIR

AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

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Books of the Week

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ASTRONOMY—William T. Skilling and Robert S. Richardson—*Holt*, 2nd ed., 692 p., illus., \$4.75. This textbook, for a first college course in astronomy, has been revised along lines indicated by results of questionnaires which the authors sent to teachers using the first edition.

ESSENTIALS OF PHARMACOLOGY—Frances K. Oldham, F. E. Kelsey, and E. M. K. Geiling—*Lippincott*, 440 p., \$5.00. A concise and effective introductory text, dealing fully with the entire field of pharmacology, in which general principles are stressed, drugs are discussed in groups according to functions.

EUROPE'S POPULATION IN THE INTERWAR YEARS—Dudley Kirk—*Princeton Univ. League of Nations Publication*, 1946 II. A.8, 303 p., illus., \$3.50, paper, \$4.00, cloth. This fundamental demographic study explores the changing human resources of 27 European countries, measuring the basic regional differences in population characteristics, which significantly do not coincide with national or socio-economic frontiers.

GENERAL CHEMISTRY—Linus Pauling—*Freeman*, 595 p., illus., \$4.25. An orderly presentation of descriptive chemistry and modern chemical theory, intended for college students whether or not they have had previous training in the subject.

THE GERMAN OILSEED INDUSTRY—W. H. Goss—*Hobart*, 248 p., illus., paper, \$17.50. A well-documented treatise comprising an extensive study of the soybean oil industry in Germany.

HIGHLAND COMMUNITIES OF CENTRAL PERU A Regional Study—Harry Tschopik, Jr.—*Govt Printing Office*—Smithsonian Institution, Institute of Social Anthropology, Publication No. 5, 56 p., illus., paper, 50 cents. A discussion of the mixed and varied culture of the Central Highlands, including descriptions of physical setting, population, commerce and communication, as well as a detailed study of life in the respective communities.

HOW TO SPEAK EFFECTIVELY ON ALL OCCASIONS—George W. Hibbitt—*Halcyon House*, 308 p., illus., \$1.98. Intended to aid the reader in increasing his ability as a speaker, this book includes sections on factors making for effective speech, various occasions requiring different types of speech, and the elements of composing speeches.

IS MARRIAGE NECESSARY—George A. Bartlett—*Pelican*, 179 p., paper, 35 cents. A Judge writes of marriage and its problems from his experience on the bench of the Reno divorce court.

MAYA EXPLORER—Victor Wolfgang Von Hagen—*Univ. of Okla. Press*, 324 p., illus., \$5.00. Biography of John Lloyd Stephens, who rediscovered a lost culture in Central and South America, and became "the father of Mayaism."

THE METROPOLITAN LIFE A Study in Business Growth—Marquis James—*Viking*, 480 p., \$5.00. The story of the development of this biggest business in the world from a struggling private enter-

prise to a semi-public institution sponsoring health and welfare programs, housing developments, medical research and educational activities, and development of the field of industrial insurance.

THE PRACTICAL NURSE—Dorothy Deming—*Commonwealth Fund*, 370 p., \$3.00. A comprehensive work on the functioning of the practical nurse in homes, hospitals, public health, and industry, with suggestions for expansion and improvement of her service in the future.

READING AND VISUAL FATIGUE—Leonard Carmichael and Walter F. Dearborn—*Houghton*, 483 p., illus., \$5.00. Written for all those interested in the functioning of the eyes, this book not only summarizes existing literature but reports extensively on new experiments in the field, with high school and college students as subjects.

RESEARCH ON WAGES. Report of a Conference Held on April 4-5, 1947, at the Yale Labor and Management Center, prepared for the Committee on Labor Market Research—Lloyd G. Reynolds—*Soc. Sci. Res. Council*, Pamphlet 4, 41 p., paper, 50 cents. A summary of the conference discussion on several aspects of wage policy, with suggestions for further research in this field.

SCIENCE TEACHING—Arthur G. Hoff—*Blakiston*, 303 p., \$3.75. Designed as an aid to the science teacher, this volume indicates for the instructor the means of preparing the student for adapting to a scientific environment and for utilizing intelligently the materials and facts of modern science.

SELF-HELP GEOMETRY WORKBOOK—H. D. Welte, F. B. Knight, and L. S. Walker—*Scott, Foresman*, 84 p., illus., paper, 72 cents. Developed to assist the student to a more thorough and full mastery of plane geometry, the workbook provides 34 drills on the major topics as well as discussion units for the more difficult subject matter.

A STUDY OF INDIVIDUAL CHILDREN'S DIETS—E. M. Widdowson—*British Information Office*, Medical Res. Council Special Report Series, No. 257, 196 p., illus., paper, \$1.90. This survey made in the British Isles, analyzes the food consumption and values received by each child in selected groups.

TEST YOURSELF!—William Bernard and Jules Leopold—*Hellman, Williams*—94 p., illus., \$2.00. The blurb on this book says "Find out what makes you tick. Learn your strong points and your weaknesses. See yourself as others see you. . . If you dare!" Psychologists won't agree that anyone can take a short paper-and-pencil test, such as the 30 in this book, and tell whether he is a good lover, has esthetic taste, has superior judgment, etc.

TEXTBOOK OF BACTERIOLOGY—Thurman B. Rice—*Saunders*, 4th ed., 603 p., illus., \$6.50. A practical textbook for those who seek an understanding of bacteriology without probing its more theoretical aspects.

TREASON'S PEACE—Howard Watson Ambruster—*Beachhurst*, 438 p., \$3.75. The well-documented story of IG Farben, the German dye trust, from its origins in six

small coal-tar dye companies to its recent position as a huge international and cartelized chemical combine having world domination as its ultimate aim.

THE USE OF THERMAL CONDUCTIVITY CELLS FOR GAS ANALYSIS IN STUDYING THE FISCHER-TROPSCH SYNTHESIS OF HYDROCARBONS—Edmond L. D'Ouille and K. Elizabeth Howe, 6 p., illus., paper. Free from *Mellon Institute*, Pittsburgh, Pa.

Science News Letter, October 25, 1947

PHYSICS

Electrically Heated Glass Adds to Plane Safety

➤ A NEW glass, that conducts electricity and therefore can be electrically heated to keep it free of ice, is being installed in the control cabins of the new Boeing giant Stratocruiser passenger planes, in Seattle, Wash.

This glass, called Nesa and developed by the Pittsburgh Plate Glass Company, has inside and outside layers of plate glass with a layer of a clear vinyl plastic between. On the inside surface of the outer layer is a transparent but electrically conductive coating, whose composition is secret. By passing an electric current through the coating, regulated heat can be applied to the glass, keeping it ice and fog free at all times.

Science News Letter, October 25, 1947



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Science News Letter, October 25, 1947

☼ **TONGUE DEPRESSOR**, similar to the familiar strip of wood used in examinations of the mouth cavity and throat, has a cavity near one end to hold a confection. The confection could be a candy for children, or a drug mixture if desired. The device was recently patented.

Science News Letter, October 25, 1947

☼ **MOISTURE METER**, to determine the moisture content of sand in bins and soils in the field, operates on the electrical conductivity of the material under test. Two arms of the device are thrust into the sand; one compresses the sand into a cup-shaped formation, the other sends a battery current through the pressed material.

Science News Letter, October 25, 1947

☼ **SIGHT GLASS** assembly, inserted in discharge tube of an automatic washing machine, permits the housewife to see the dirty water as it flows to the drain and note that successive rinse waters become clearer. It is a two-inch heat-treated glass cylinder with the necessary couplings.

Science News Letter, October 25, 1947



☼ **FLUORESCENT WALL LAMP**, a portable type that can be hung where needed and connected to an electric outlet by an extension cord, contains two 20-watt tubes shielded by a diffusing panel of frosted ribbed glass. It gives both direct and scattered light, as shown in the picture, and is usable from kitchen to bedroom.

Science News Letter, October 25, 1947

☼ **HEARING AID** selector permits the testing of a deafened person with a possible 140 combinations of component parts such as tubes, receivers and elec-

tronic circuits. The combinations are quickly switched from one to another until the one best suited for the particular deaf person is found.

Science News Letter, October 25, 1947

☼ **SCREW ANCHOR**, for holding screws in holes in glass, concrete and other hard material, is a plastic plug which has a lengthwise cross-arm opening in its center and lengthwise grooves on its outer surface. The plug is strong enough to be driven into a tight hole, within which it is firmly fixed by expansion when a screw is inserted.

Science News Letter, October 25, 1947

You are invited to accept one of the few memberships still vacant in

Things of science

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Question Box

CHEMISTRY

To what will the understanding of "chemical kinetics" lead? p. 262.

INVENTION

What new device would park cars automatically? p. 265.

MEDICINE

How does the gene theory affect the hope for conquest of cancer? p. 264.

What diseases have been found to cripple or kill babies before they are born? p. 268.

NUCLEAR PHYSICS

What theory has been confirmed about the atom's nucleus? p. 259.

What methods exist to detect test explosions of an atom bomb? p. 261

OTOLARYNGOLOGY

How was an artificial throat made to save a girl's life? p. 270.

PHYSICS

What new prediction has been made for hearing aids? p. 263.

PUBLIC HEALTH

What do quarantine experts hope to accomplish in the war against cholera? p. 260.

Photographs: Cover, Dr. Wilson Powell; p. 259, Westinghouse; p. 261, Yale University; p. 263, Ralph E. Lawrence.

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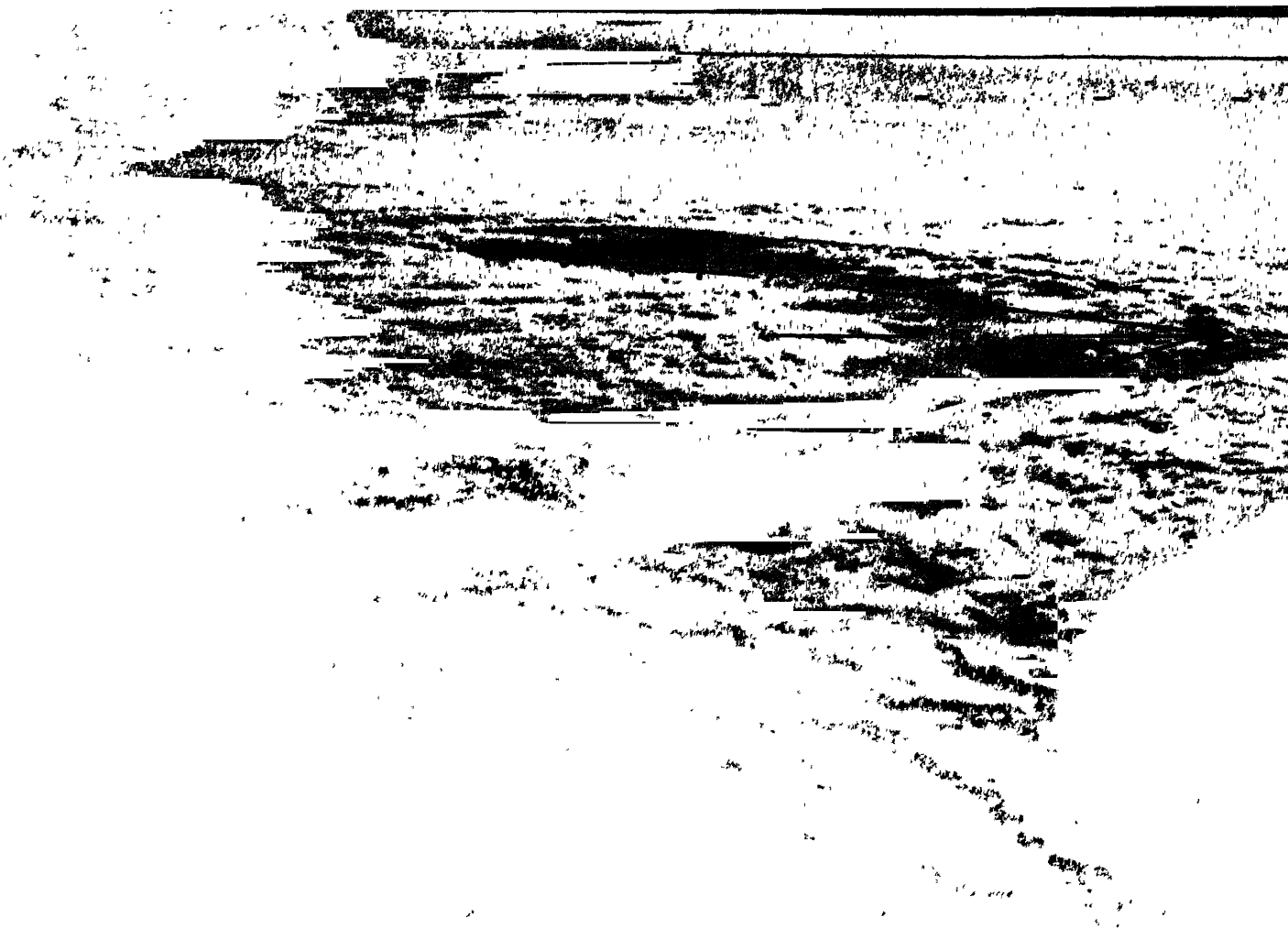
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SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION

GENERAL SCIENCE

Science Needs Support

A compromise is needed between the President and Congress to advance science with government support via a National Science Foundation.

By WATSON DAVIS

➤ BECAUSE Congress and the President couldn't agree about how to run a National Science Foundation, the nation is without strong government support of the kind of fundamental scientific research that may decide between future abundant life and disastrous destruction of civilization.

Congress passed a bill that provided a foundation controlled by a board of two dozen part-time members, but President Truman vetoed it because he wanted it run by an administrator with an advisory board.

The next session of Congress will have the same line-up and players. There is not much hope that either side, President or Congress, will adopt the other's plan.

Scientists and the public, polls and inquiries have shown, want science to advance with government support.

They want essentially civilian direction of scientific research, despite the necessary accelerated development of science for military use and the stop-gap grants being given munificently by the armed forces to universities and other laboratories.

So, Mr. President and Mr. Congressman, how about a new plan? Could you get together for the sake of the nation, on some such scheme as this:

1. For the controlling body, authorize a U. S. National Science Commission of five full-time members.

The commission form of organization is a workable, approved method of government administration, as in the Atomic Energy Commission, the Federal Trade Commission, the Federal Communications Commission, the Federal Power Commission, etc.

2. Incorporate in the new bill for a National Science Commission the salient features of the bill that passed in the last session, modified as necessary to be acceptable to both the President and Congressional leaders.

3. Invite all members of Congress to join in introducing the bill in the next session of the 80th Congress. There is excellent precedent for this unity for science. In the 75th Congress, S. 2067 "authorizing the Surgeon General of the U. S. Public Health Service to control and prevent the spread of the disease of cancer" was introduced jointly by every member of the Senate. The bill passed. Few members of the present Congress will wish to go on record "against science" in this atomic age, just as in 1937 no member of the Senate could afford to be in favor of cancer.

Mr. Truman, why not ask the Senate and House backers of the National Science Foundation bill to confer with you? This is an international emergency, as important in the long pull as filling empty human stomachs.

Science News Letter, November 1, 1947

Nickel was first discovered as an element in 1751 by a Swedish scientist.



WINS AWARD—Dr. Bernardo A. Houssay, of Buenos Aires, is the co-winner of the Nobel prize in medicine. He discovered the relation between the pancreas and the pituitary gland.

lutions per minute, the sound has a pitch of 30,000 cycles, and is too high for the human ear to hear.

White mice placed in the sound field died after one minute of exposure. Another mouse, exposed a half minute, appeared normal eight minutes later. The following day, however, its outer ear had deteriorated. The silent siren also was found effective in killing insects. Mosquitoes died in 10 seconds but a monarch butterfly caterpillar lived 215 seconds.

Possible uses for the device include the sterilization of foods, medical treatments and surgery, treatment of seeds to increase germination, elimination of the smoke menace, and speeding up chemical reactions.

When the human hand is placed over the siren, the heating is felt at those parts of the fingers that are close together but not quite touching. Temperatures were measured with a thermocouple attached to the hand. They were also measured with the thermocouple attached to soft rubber tubing in place of the fingers. Increases as much as 45 degrees Centigrade were noted. With stiff rubber tubing the temperature increases were slight. The heating, therefore, seems to be produced by the damping of vibrations set up in the fingers by the intense sound field in the region between them.

Science News Letter, November 1, 1947

PHYSICS

Sound Kills Mouse

➤ SOUND too high-pitched for the human ear to hear, given out from a lantern-shaped siren developed at the Pennsylvania State College, contains enough heat energy to light a pipe, pop corn, or to kill a mouse, it is now revealed.

The device is called an ultrasonic siren. Details of its construction, together with some of the biological effects secured with it, appeared in the *Journal of the Acoustical Society* (Sept.). The

report was by C. H. Allen and Dr. Isadore Rudnick who developed the siren under the direction of Dr. H. K. Schilling, director of the Penn State acoustics laboratory.

In the siren, compressed air in a small chamber escapes through 100 small holes shaped like cones and spaced equally on a six-inch circle. As air escapes, a wheel with 100 teeth chops the air into pulses. Each pulse then becomes a sound wave. When the wheel spins at 18,000 revo-

GENERAL SCIENCE

Nobel Prize Awarded

Two men and a woman are the winners in medicine for their researches which may pave the way to a possible conquest of diabetes.

➤ THE millions of diabetics throughout the world may well cheer the 1947 Nobel Prize award in medicine and physiology as they cheered the same award nearly a quarter of a century ago. Then (1923) it went to the discoverers of insulin, the diabetic's lifesaver. This year the award goes to two men and a woman whose fundamental researches will certainly do much to pave the way for a final conquest of diabetes, if that is ever made.

This year's Nobelists in medicine and physiology are Dr. Carl F. Cori and his wife, Dr. Gerty T. Cori, of Washington University School of Medicine, St. Louis, and Dr. Bernardo A. Houssay, of Buenos Aires.

The discovery of insulin, in 1922, brought life and health to diabetics. But, as any diabetic forced to take his insulin "shot" daily and sometimes oftener can tell you, the life-saving chemical is not a cure. And any biochemist can tell you that the discovery of insulin loosed a thousand questions to be solved.

Insulin is produced by islands of tissue in the pancreas. In diabetes, these islands stop producing the chemical. Without it a person dies. Give it to a dying diabetic and he is restored to life in a few hours. Why does it stop the drain of needed sugar from the body? How does it promote the burning of sugar in the muscles?

Solution to many questions about what happens in the body to sugar and starch eaten in food was found by the Coris. They discovered how sugar, stored in the liver as another chemical, glycogen, is converted back to sugar for transport in the blood to the muscles for reconversion there to glycogen. They also discovered that if the muscle fails to burn sugar completely the waste products are returned to the liver for conversion to glycogen.

The Coris' discovery of how insulin acts to promote burning of sugar was made following one of Dr. Houssay's discoveries. This was the relation between the pancreas and the pituitary gland. The

death from diabetes which usually occurs after the pancreas with its insulin-producing islands is removed can be prevented if at the same time this tiny gland in the head is removed. While Dr. Houssay went on to show further relationships between the various glands of the body, including the thyroid and adrenals as well as the pituitary and the pancreas, the Coris kept on with their studies of sugar utilization.

The key reaction in the burning of sugar in the body is not affected by insulin, but can be completely blocked by chemicals from the pituitary or adrenal glands. Insulin, however, lifts the blockade. This discovery of where and how insulin acts has given scientists a laboratory method for testing insulin substitutes. Its importance lies in the fact that an insulin substitute is badly needed, since increasing demands for insulin may some day outrun the supply.

Science News Letter, November 1, 1947

PHYSICS

Navy Seeks New Design For Magnetic Compass

➤ THE Navy is seeking a new design for one of the oldest instruments used in navigation, the magnetic compass.

But the new compass, which scientists are working on at the Navy Material Laboratory at the New York Navy Shipyard, is a remote-reading magnetic compass which will accurately indicate directions despite heavy seas and the firing of modern guns.

During World War II, the Navy substituted remote-reading compasses for more conventional direct-reading instruments. A shortage of non-magnetic materials made it necessary to have a compass high on the mast of a ship, from which remote indicators could be read in the wheelhouse.

This system, which used aircraft compasses on the mast of the ship, was not entirely satisfactory as the roll and pitch of the ship frequently made for inaccurate readings.

Now the Navy is trying to develop a remote-reading compass which will serve effectively under the conditions of modern naval warfare. Two devices being used in tests of new compass designs are a 75-foot, non-magnetic mast and a "Scorsby," an instrument which tests vibrations under conditions of rotation and controls the earth's magnetic field in an area large enough for accurate testing.

Science News Letter, November 1, 1947



NOBELISTS—Dr. Carl F. Cori and his wife, Dr. Gerty T. Cori, of Washington University School of Medicine, St. Louis. *Illustration by*

GENERAL SCIENCE

Why No Nazi Atomic Bomb

Germany's scientific prestige suffered because of their failure. They did not understand the difference between the atomic pile and the bomb itself.

➤ GERMANY'S scientific prestige suffered a supreme defeat when during the war German scientists, among them Otto Hahn who discovered uranium fission in December, 1938, failed to make an atomic bomb.

Now, over two years after Hiroshima, the story can be told of just what was happening under Hitler while America was achieving the bomb.

The fact is that the Germans wanted to make an atomic bomb. But they never found out how. They were working on a uranium machine or what we call an atomic pile. They didn't quite succeed in getting a self-sustaining chain reaction in the pile as Americans did in December, 1942, although they nearly did just before American troops reached Haigerloch in April, 1945.

In a colorful story of the U. S. Mission that captured German atomic scientists and apparatus, Prof. Samuel A. Goudsmit of Northwestern University (the book *ALSOS*, Schuman, \$3.50) writes that the German scientists failed to understand the difference between the uranium machine they tried to build and the bomb itself. They thought the pile would be the bomb.

The German scientists did not know about plutonium, the new and heavier fissionable element made from uranium, until after the whole world knew about it with the U. S. announcements after Hiroshima.

Prof. Werner Heisenberg, leading German theoretical physicist whose contributions rank with those of Einstein, was a leader in German atomic research. Prof. Goudsmit tells how Heisenberg openly fought Nazi excesses, defended Einstein's theory of relativity which was to Hitler "Jewish" physics. But Heisenberg's "extreme nationalism led him astray during the war" and he was one of the German scientists taken into custody by the American ALSOS mission when it moved into Germany on the heels of our troops.

Prof. Heisenberg himself, in a paper which appeared in the German journal *Die Naturwissenschaften* a few weeks ago, gives his version of why the atomic bomb was not a German achievement.

"In Germany," he writes, "an attempt was made to solve the problem of the prime mover driven by nuclear energy, with an outlay of perhaps a thousandth part of the American outlay. We have often been asked why Germany made no attempt to produce atomic bombs. The simplest answer that one can give to this question is this: Because the project could not have succeeded under German war conditions."

Heisenberg tells how German industry was stretched to the limit in 1942. More importantly he says "the undertaking could not be initiated against the psychological background of the men responsible for the German war policy." The military leaders would not back anything that did not promise early results.

Prof. Goudsmit in his book blames complacency, deterioration of interest in pure science, and regimentation in the administrative control of science for the German failure. These three German errors are the principal ones that the United States can make in its further development of atomic energy if, Prof. Goudsmit warns, we are not on guard against them.

Science News Letter, November 1, 1947

CHEMISTRY

Heavy Carbon Atoms Are Separated by New Method

➤ AN improved method of separating the rare kind of carbon of atomic weight 13 has been devised by Dr. H. London, a young refugee scientist, working in Britain's atomic energy laboratory at Harwell.

Already the amount of this heavier carbon isotope has been increased by a quarter in ordinary carbon monoxide gas. Carbon 13 is valuable because it can be used as a tracer to discover how medical, biological and industrial processes actually operate.

Unlike radioactive carbon 14 made in the atomic pile, carbon 13 does not bombard with radiation the organism in which it is placed and thus can be used for some purposes for which the radioactive carbon is unsuited.

The improved British process consists of distilling carbon monoxide over a large area column into liquid nitrogen as a cooler.

Science News Letter, November 1, 1947

Hybrid forest trees, that may grow to harvesting size in one-half the time required by ordinary trees, may soon become common; already there is a hybrid pine that at three years of age is twice as large as normal pine.

A deposit of more than 8,000,000 tons of *lignite* has been discovered a few miles east of Toledo, Wash., in the center of the Pacific Northwest's wartime fuel famine area.

SCIENCE NEWS LETTER

Vol. 52 NOVEMBER 1, 1947 No. 18

The weekly summary of Current Science, published every Saturday, by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D.C., North 2255 Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D.C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U.S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439.

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The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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METEOROLOGY

Artificial Weather Made

Pelting certain types of clouds with dry ice may lead in future to less hail damage, man-induced snow and rainfall and ice-free flying for planes.

See Front Cover

➤ WIDESPREAD man-made climate changes, particularly in the winter, may be possible with techniques now used to produce snowfall or rain from certain types of clouds.

This revolutionary prospect was disclosed by Dr. Irving Langmuir of the General Electric Company, Schenectady, N. Y., in the first official report on Project Cirrus, the joint Army Signal Corps, Office of Naval Research, Air Force and General Electric program for research into controlling weather.

Other possibilities suggested by Dr. Langmuir included:

Less severe thunderstorms.

No hail.

Man-induced snow and rainfall over mountain areas to fill reservoirs for irrigation and hydroelectric power.

Prevention of ice storms, storms of freezing rain and icing conditions in clouds.

Fewer clouds in the northern U. S. during the winter.

These are future possibilities. Already scientists on the project believe they have conquered the problem of ice formation on airplanes, the report explained, as shown on the front cover of this week's SCIENCE NEWS LETTER.

Attacking dangerous, ice-forming clouds with dry ice, perhaps in the form of bullets shot ahead of the plane, will clear a safe path through the clouds, flight experiments have proved.

A plane flying over an icing cloud should be able to clear a hole through the cloud in 15 minutes with a bombardment of dry ice, it was reported. In taking off, the plane would "seed" the lower layer of the cloud with dry ice to clear a path up through the dangerous cloud.

Attempts to change the cloud formations over an area such as the northern U. S. will have to wait for research development and experiments.

"Obviously," Dr. Langmuir pointed out, "experiments producing widespread effects should be made in relatively unpopulated regions such as Alaska or northern Canada."

Wartime smoke generators using silver iodide instead of smoke might be used on the ground for large-scale cloud changes, the scientist suggests. Use of silver iodide instead of dry ice is being studied by another General Electric scientist, Dr. Bernard Vonnegut. "Many other substances" may be found for this attack on clouds, the report predicts.

Dry ice dropped over beginning thunderstorms as soon as the tops reach freezing level can now produce less severe storms, Dr. Langmuir explains. This would also prevent hail, which claims an estimated annual damage of \$15,000,000 on farm crops.

Over mountain areas, dry ice might be seeded on clouds to produce greater snowfall. This snow, which would fall as rain from the lower layers of clouds, might end the plague of dry years in irrigated valleys.

First experiments in converting a supercooled cloud to snow were in the General Electric Research Laboratory by Vincent J. Schaefer in July, 1946. Mr. Schaefer is now working with Dr. Langmuir in directing the cloud study.

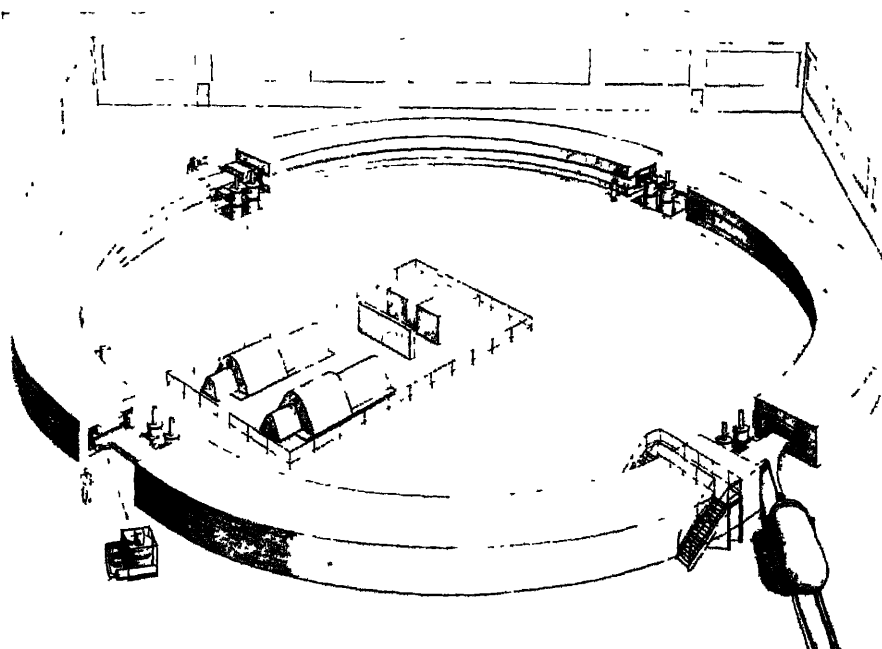
In addition to the flights and laboratory experiments made, five new flights are planned to attempt various new artificial weather operations. In one experiment, the scientists will attempt to produce clouds in clear air.

Whether or not scientists are able to tailor-make weather, the cloud experiments are revealing new facts which will help meteorologists predict weather more accurately.

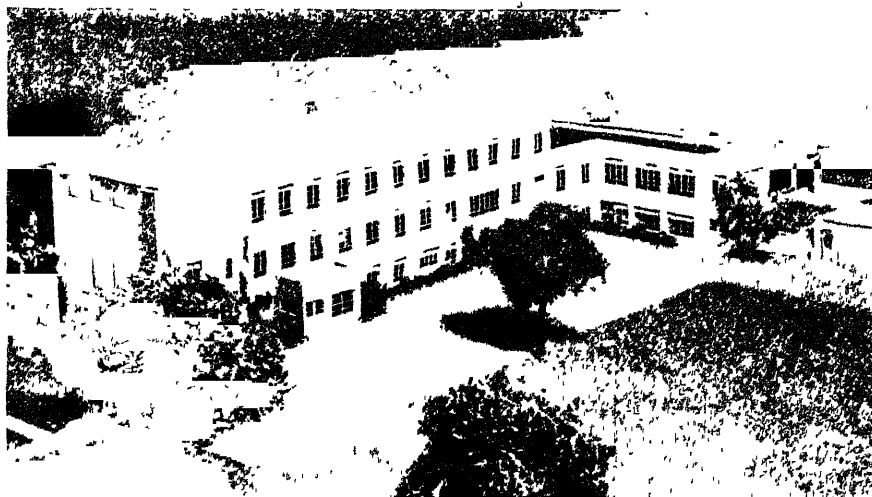
Science News Letter, November 1, 1947

A chemical called *cyclohexanone* is found to be a good solvent for DDT; it appears to irritate certain insects, making them move around more actively thus resulting in their making better contact with the DDT in the mist of the spray.

Maturity of *cotton* fiber is sometimes determined by a dyeing process; mature fiber is thick-walled, and immature fiber is thin-walled, with the result that they take up the same dyes differently.



BEVATRON—Some day this gigantic atom-smasher, plans for which are announced by Prof. E. O. Lawrence, may be built at the University of California. (See SNL, Oct. 25). It would accelerate protons, the nuclei of hydrogen atoms, to 10 billion electron volts. They are fed into it by the Van de Graaff generator shown at the lower right. The beam emerges near the man standing at the left and hits the cloud chamber generator housing in the center.



FELS RESEARCH INSTITUTE—This is a model of the structure which will house 80 new laboratories for a long-term study of the physical, mental and emotional development of human beings from conception to maturity. The building was recently dedicated.

ELECTRONICS

Earth Affects Reception

Variations in the electrical charge, or ionization, influence the wavelengths used in sending out radio broadcasts and may keep a broadcast from getting through.

➤ NEW evidence that the magnetic field of the earth causes changes in the number of electrically charged atoms in the highest layer of the earth's atmosphere, 250 miles up and of importance in sending and receiving radio broadcasts, has been advanced.

These changes are due both to energy from the sun and that obtained from here on earth. T. N. Gautier of the National Bureau of Standards stated at the joint meeting in Washington of the International Scientific Radio Union, American Section, and the Institute of Radio Engineers.

Variations in the electrical charge, or ionization, influence the wavelength used in sending out radio broadcasts. Sudden changes sometimes keep a broadcast from getting through.

In the lower layers of the atmosphere, 75 miles or so above the earth, there is only a slight day-to-day fluctuation at a given place. But in the highest layer this fluctuation averages 10%. Changes as great as 30%, 40% and even 50% have been noted.

Because of local variations, it is not feasible to use conditions recorded at one

place for making day-to-day forecasts of radio conditions in another, distant region.

At Washington and San Francisco, ionization of atoms in this highest layer tends to increase and decrease at the same time. But near the equator, ionization at Huancayo, Peru, for instance, may increase while it is decreasing at Christmas Island in Polynesia. The local cause of these variations is therefore probably geomagnetic, Mr. Gautier stated.

The total eclipse of the sun last May gave astronomers an opportunity to compute how fast ions in the upper air recombine. The cutting off and restoring of light during the eclipse was, for research purposes, actually a rapid sunset and sunrise. A. H. Shapley of the National Bureau of Standards told the meeting.

Atoms in the highest layer of the earth's atmosphere were not as much affected as was expected, he pointed out, whereas the density of electrons in the layer 75 miles up, dropped to about 37% of its usual density. At nighttime this ionization goes down even more.

Science News Letter, November 1, 1947

GENERAL SCIENCE

Fels Research Institute Dedicates New Laboratory

➤ WHEN the mother of an unborn baby smokes, the baby's heart beats faster.

At least one out of seven babies examined hiccup before birth; this may be due to lack of oxygen.

Babies that move around a lot before birth have the highest scores on baby tests after birth.

These and many other facts about the development of babies and older children are being gathered at Yellow Springs, Ohio, in a long-range research program of the Fels Research Institute for the Study of Human Development under the direction of Dr. Lester W. Sontag. A new laboratory of 80 rooms devoted to this research was dedicated in October.

A group of 130 children are being studied from about four or five months before birth until they are well into their teens. The study has now been going on for 18 years, although the number of children under observation has increased from less than 20 in the first year to the present 130.

Among the many factors of growth and the influences on growth being observed are: bone development as shown by X-ray, growth in size, nutrition, blood pressure, heart rate, allergies, illnesses, accidents, emotional adjustment, and mental development.

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PSYCHOLOGY

Loss of Strength After 25 Indicated by Tests

➤ YOU begin to lose your strength at the age of 25. That is when "old age" sets in, it appears from measurements of hand strength made on 552 men industrial workers by Dr. M. Bruce Fisher, of Fresno State College, California, and Dr. James E. Birren, of the U. S. Public Health Service when both were on duty at the Naval Medical Center, Bethesda, Md. (*Journal of Applied Psychology, Oct.*)

Strength increases up to the middle twenties, these tests show, and then goes steadily down. By the age of 60, the average loss of strength amounts to 16.5%. There is, however, considerable overlapping among different age groups.

Lack of exercise cannot be the explanation for the loss, the investigators feel, because all the men were actively engaged in the same sort of work.

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MEDICINE

Filariasis Under Attack

Progress with four chemical compounds is being made against this tropical disease which attacked service men in the South Pacific and causes elephantiasis.

➤ PROGRESS in chemical warfare against a disease affecting hundreds of millions of persons, though it seldom causes an epidemic, was announced at meetings at the New York Academy of Sciences in New York.

The disease is filariasis. It is a tropical disease which attacked some of our fighting men in the South Pacific and caused grave concern to many more because of the elephantiasis which is a late result in untreated cases.

Until recently, hardly any chemical tried against it succeeded as a remedy. The disease is caused by a kind of worm and is spread by mosquitoes.

Today, four kinds of chemical compounds show promise of leading to conquest of filariasis. The four are: new antimony compounds (antimony has long been the stand-by for treatment of the disease); arsenical compounds; cyanine dyes; and piperazines.

One of these piperazines, called hetrazan for short, was given to 26 filariasis patients in Puerto Rico, Dr. J. Oliver-Gonzalez of the School of Tropical Medicine, Puerto Rico, reported.

They got the drug by mouth three times a day. In all cases the number of baby or embryonic worms, called microfilariae, in their blood was markedly reduced in two days. In nine of the 26 none could be found at this stage of treatment. In 11, tests 30 to 150 days after treatment, which was given from three to 22 days, no microfilariae could be found. In the remaining 15 all but one had reductions of 85% or more from the original count of microfilariae. Nine patients followed for four to five months have shown no recurrences.

Even in those who did not get to zero in the count of microfilariae in their blood, the number was so reduced that mosquitoes could not become infected. This is of great importance, Dr. Oliver-Gonzalez pointed out, in considering the usefulness of the drug.

Safety of the drug was reported by Dr. D. Santiago-Stevenson. Patients had no severe reactions though some developed fever during the first two days.

The drug may also kill the grown-up worms, believed responsible for blocking

the lymph channels and causing the grotesque and often horrible swelling of elephantiasis. Evidence for this in the patients was reported by Dr. Santiago-Stevenson and also in laboratory studies on cotton rats and dogs treated by Drs. R. I. Hewitt, D. E. White, S. Kushner, W. S. Wallace, H. W. Stewart and Y. Subbarow of Lederle Laboratories, Pearl River, N. Y., where the drug is made.

Cyanine dyes are now also being tried on patients in Puerto Rico, Dr. L. Peters of Western Reserve University, Cleveland, reported. These dyes are prepared by Dr. L. G. S. Brooker of Eastman Kodak Research Laboratories. Tests on rats and dogs by Dr. Peters and Dr. E. Bueding at Western Reserve and by Dr. J. T. Litchfield and associates at the University of Minnesota show the dyes to be effective in animals. They have to

be given by injection into the veins to get the best results.

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PHYSICS

Shock-Absorbing Liquid Found Among Silicones

➤ SPRINGY liquids capable of use as a new type of shock-absorber have been discovered among the novel forms of matter known as silicones. This unusual property was detected by measurement of inaudible sound in the new fluids, which are already famous for their resistance to extremes of temperatures.

Properties of silicones, which are near relatives of both the rocks of the earth and the plastics of industry, were discussed at the high polymer forum of the American Chemical Society meeting in New York. Dr. Alfred Weissler of the U. S. Naval Research Laboratory told how ultrasonic waves measured by a new method in the silicone liquids can be used to determine the weight of these giant molecules. Their unusually high compressibility was discovered during these determinations.

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TEPEXPAN MAN—Found recently in a Mexican lake-bed dating some 10,000 to 15,000 years ago. (See SNL, July 5). His bones were brought from the Mexican National Museum to the Smithsonian Institution in Washington and there reconstructed. A. Joseph Andrews is making a cast of the head which the museum hopes to send to the United Nations Scientific Meeting in Mexico.

BIOLOGY

Penicillin Kills Germs In Microscopic Animals

➤ **PENICILLIN** kills bacteria not only in man and the larger animals but in animals too small to see without a microscope. This discovery is announced by Gerald R. Seaman of Fordham University. (*Science*, Oct. 3).

The microscopic animals, belonging to the order Protozoa, are not necessarily sick because they have bacteria in them. The bacteria are just there, as many harmless bacteria are "just there" inside ourselves. Some kinds of protozoa even devour bacteria as the main part of their diet.

However, it is sometimes desirable to have the little animals in a germ-free condition so that results of experiments with them will not be messed up by the presence of the bacteria with their own biological processes.

Protozoa cannot stand being kept too long in the bacteria-killing bath of penicillin solution, the Fordham zoologist states. One lot that he tried were still swimming around vigorously after five hours but were dead at the end of 12 hours.

Science News Letter, November 1, 1947

NUTRITION

Ten Foods Listed as Base for Year-Round Menu

➤ **HARASSED** homemakers, trying to balance food budgets without sacrificing the family's health, would do well to adopt the following as the backbone of their year-round menu planning:

White potatoes, whole-wheat bread, rolled oats, beef and pig liver, pea beans, rutabagas, carrots by the pound, spinach, and milk, fresh or canned.

This is the conclusion of a two-year study made in Ithaca markets by Mabel Rollins, associate professor of home economics at Cornell University.

Miss Rollins priced 107 foods at two-week intervals in seven stores. She found those mentioned practically always available with relatively small price fluctuations, and were comparatively inexpensive in relation to dietary essentials contained.

At other seasons, other foods would qualify for the "cheap and nourishing" list, she says. Among cheap and nourishing foods at this season are Hubbard squash, sweet potatoes, and green cab-

bage. She also advises that housewives could do worse than cultivate a taste for kidneys (beef, calf and lamb).

The study took into consideration the fact that many foods have much higher percentage of waste than others, as well as the amount of dietary essentials.

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PUBLIC HEALTH

Possible to Vaccinate All Egyptians Against Cholera

➤ **EGYPT'S** entire population could be vaccinated against cholera within one month, half of it within a few days, Dr. Brock Chisholm of the World Health Organization's interim committee estimated.

His estimate was based on figures for cholera vaccine production, which went into high gear to meet the emergency. Enough to vaccinate 750,000 people was sent by air Oct. 25. Another, slightly larger amount was ready within another week, and if the need continues, production can go to three times that amount per week.

Cholera cases, now officially tallied at 4,785 and unofficially estimated at well over 5,000, are expected to continue increasing for a short time. But there are already signs that the epidemic is leveling off. A precipitous drop should start soon, as more and more people are vaccinated and other control measures become increasingly effective.

Never before in history, Dr. Chisholm said, has a cholera epidemic that started up as swiftly as this one been stopped at anywhere near this level. Egyptian health authorities have "done a truly remarkable job in checking the spread of the disease," he declared, adding that there has also probably never before been such international cooperation.

A virtual "freezing" of Egypt's population is considered one of the important measures that helped check the spread of the disease. The epidemic started at El Karim with five cases on Sept. 22. Two days later the prime minister advised military cordons around the infected areas to stop all but necessary official travel into and out of them. The cases have still been largely confined to rural areas.

All pilgrimages to Mecca were stopped, but the first group had already gotten off. No case of cholera among Mecca pilgrims or anywhere else that could be traced to the Egyptian epidemic has occurred, so far as WHO information goes.

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IN SCIENCE

AERONAUTICS

Floating Seaplane Berth Makes Landings Easy

➤ **THE** Navy has a new self-propelled floating seaplane berth which will make landings from flying boats easy. The aircraft anchors in waters off-shore and the berth is swung to its side.

The berth is built of pontoons and operates on a 600-foot submerged cable. It can be swung in any direction to permit a plane to taxi on the water into the wind while entering or leaving the slip. As a result the pilot is relieved of the task of maneuvering a large flying boat to a dock or mooring buoy, a difficult job in high winds or choppy seas.

The mooring of the plane in the movable berth is further simplified by the slip's bell-mouthed entrance and by a system of water jets, three on each side of the entrance, which push the plane from one side of the slip to the other. Partially-filled airplane tires along the two inner sides of the berth prevent damage to the airplane on contact.

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METEOROLOGY-AERONAUTICS

New Portable Instrument Measures Low Wind Velocity

➤ **WIND** speed and direction are accurately indicated by a new portable instrument of high sensitivity just revealed by the National Bureau of Standards, where it was developed. It is designed particularly for use in take-off tests at landing fields.

The instrument is mounted on a sturdy tripod like a surveyor's transit and can be leveled in the same way. Wind velocity is measured by means of a propeller forced to head into the wind by a vane. Its speed is registered on a magnetic tachometer, while its direction is indicated at the same time on a circular horizontal scale by a needle connected to the shaft of the vane.

One feature of the new instrument, developed by S. H. J. Womack and F. Cordero of the Bureau staff, is that it can be used to measure very low wind velocities. Previous instruments were not suitable for use in take-off tests.

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E FIELDS

MEDICINE

Crippled Polio Victims Increase in Recent Years

► THE number of children and young people in the United States crippled by polio has increased almost 45% in the past seven years. It has risen 100% in the last two years, reports to the U. S. Children's Bureau show.

This is what might be expected since we have just passed through the longest period (1943 through 1946) of sustained high numbers of cases of the disease in the history of the country.

Nearly 74,000 persons under 21 years of age were crippled to some degree by the disease as of Jan. 1 of this year, statisticians of the Metropolitan Life Insurance Company point out. At the beginning of 1940 the number was in the neighborhood of 51,000. Only a small part of this rise is due to an increase in the number of children in this country.

Children are the chief victims of poliomyelitis, which nevertheless attacks persons of all ages. It is responsible for one-fifth of all orthopedic handicaps of boys and girls under 21.

The largest increase in crippled survivors was recorded by Utah, which showed a rise of 230%. Other states in which the rate at least doubled during this period were Arkansas, Colorado, Ohio, Tennessee and Indiana.

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GENERAL SCIENCE

Science Magazine Tries To Fill Nazi-Caused Gaps

► TO FILL up the great gaps in scientific knowledge caused by Nazi perversion of education is first objective of a small group of German science writers who have established their publication center at the town of Murnau, near Munich. They issue a monthly popular science magazine under the starry name of *Orion*, and have also begun to publish pocket-size, paper-bound books.

"Our objective is two-fold," states one of the editors. "First, we wish to lay a foundation of knowledge, especially for the young people, who in the years of Hitlerism and the war learned less and less year by year and now show terrible

gaps in their education. But the grown-ups, too, have altogether too little knowledge, and the little that they know has often been distorted and falsified in the worst possible way under the Nazis.

"Second, with this foundation laid, we wish to give our readers the materials which they need to create for themselves a correct picture of a world in which many new things are constantly developing."

Editor-in-chief of the new venture is an engineer, Erich Lasswitz, who for 25 years conducted the science page of the *Frankfurter Zeitung*, one of Germany's most progressive newspapers. Goebbels had him thrown out of his job and threatened him with the concentration camp. The other editors are younger men who, however, were already well educated before Hitler came to power.

The tale of their present troubles has a familiar sound to any American editor: inadequate working space, difficulty in finding people who can write good copy, and above all the everlasting shortage of print paper. They say they could double their circulation overnight if they could get the paper on which to print.

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ORNITHOLOGY

Many Records Listed Of Torpidity in Birds

► DO birds hibernate?

Usual answer to that question, from biologists, is an emphatic "No." Some doubt is cast on this confidently positive denial by W. L. McAtee, veteran naturalist of the U. S. Fish and Wildlife Service.

On two different occasions, he states, he has found chimney swifts in a torpid, almost death-like state, late in the season after other birds of this species had flown south for the winter. Warmed up and released, they flew away. Through correspondence with other competent scientists, he learned of further instances of the same kind.

That set him to searching ornithological publications for as many recorded cases as he could find. In the *American Midland Naturalist* (July) he gives an annotated list of 152 titles of articles and books in which mention is made of this phenomenon. Some of them, especially the older ones, are akin to the ancient Greek's belief that swallows do not migrate but spend the winter in the mud of pond bottoms; but many are records of observations like his own, by scientifically trained persons.

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MEDICINE

Polio Virus Discovered In Blood of Patient

► A RARE discovery, the finding of infantile paralysis virus in human blood, is reported by Drs. Hilary Koprowski and Thomas Norton of Lederle Laboratories and Dr. Walsh McDermott of Cornell University Medical College and the New York Hospital in the U. S. Public Health Service's official journal, *Public Health Reports* (Oct. 10).

The presence of the polio virus has only once before been found in human blood and only rarely, in spite of many attempts, has it been found in monkeys experimentally infected.

The virus in the New York Hospital case was found in the course of efforts to determine the cause of a mild illness in a 29-year-old man. The symptoms suggested a virus infection of some kind involving the central nervous system. Polio was suspected, but the infection could have been some other virus.

Polio virus normally travels along nerve pathways to attack nerve cells in the spinal cord and brain. It is apparently only in a very occasional case that it gets into the blood.

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CHEMISTRY

New Sand Fluid Improves Rubber, Paper and Leather

► A SAND dressing to add strength and better wearing qualities to rubber, leather, paper and other materials was revealed by the du Pont Company, Wilmington, Del. It is a fluid containing extremely finely divided particles of silica, most familiar as common sand, and has "Ludox" as a trade name.

This new product, essentially salt- and sodium-free, is highly fluid even in a concentrated form. On drying it yields substantially pure silica in the form of thin films or finely divided particles which can not be re-dissolved in water. When examined by means of the electron microscope these dried particles are found to be less than a millionth of an inch in diameter.

Ludox affords a means of modifying many other materials to utilize the inherent properties of silica. These include mechanical strength, resistance to atmosphere and chemical agents, and resistance to heat. It will have many applications in industrial processes in addition to those mentioned.

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GENERAL SCIENCE

Young Scientists Sought

In order to help solve the problem of the critical shortage of scientific manpower in this country, the spotlight is again turned on scientists of tomorrow.

By RON ROSS

➤ **HERE** are some of the products of a unique scientific experiment:

Nuclear physicist who is helping build a cyclotron. Sulfa drug experimenter. Two young women scientists helping produce better hosiery and other nylon products. Medical student teaching nurses as he works toward his M.D. Chemist making technical studies of synthetic rubber product.

These are some of the young scientists discovered in a scientific experiment. Unlike a new material, they were not poured from test tubes. They were discovered in a scientific hunt for science talent among high school seniors in this country. This experiment in selecting future scientists is called the Science Talent Search.

Each year since 1942, Science Clubs of America, administered by Science Service, has conducted this competition to turn the spotlight on scientists of tomorrow in the senior classes of American high schools. The Seventh Annual Science Talent Search for the Westinghouse Science Scholarships is already underway.

Examination in December

Throughout the country, thousands of science-minded young people have been studying and conducting research which they will enter in this year's Science Talent Search. Formal examinations will be given in December, but the winners are already completing the projects which will win them college scholarships.

For the top boy and top girl among this year's 40 winners from public, private and parochial high schools there will be Westinghouse Grand Science Scholarships of \$2,400, made available by the Westinghouse Educational Foundation. Cooperation of two scientific organizations, Science Service and the Westinghouse Electric Corporation, make the search possible.

The Science Talent Search is a project to help solve the problem of sci-

entific manpower, one of the most critical shortages in this country. Cancer, polio, the common cold and a thousand other urgent problems, all must be solved with scientists as well as laboratories, chemicals and instruments. New products for better living must be developed and produced by scientists and technically trained men and women. Most precious resources of our great laboratories are the minds of scientists. Above all, there must be the slow patient accumulation of basic new knowledge on which the future applications of science are based.

Long Training Period

But there are no labor-saving, time-conserving devices for producing scientists. They must be found and trained for many years before they can turn out new weapons against disease and new developments to benefit us all. The Science Talent Search is proving its worth as a means of spotting those young scientists who will be the research leaders of tomorrow. It was designed to seek out scientifically the outstanding prospective research scientists while they are still seniors in high school.

Despite the interference of war service, a survey shows that the young winners in the first two Science Talent Searches are already well ahead in science, just five or six years after they left high school. Let us look at a few of them.

Clifford Swartz of Niagara Falls, N.Y., boasts two college degrees and is working toward a third. He is one of the atomic scientists of tomorrow. At the University of Rochester where he is studying nuclear physics he is helping to build the new cyclotron under construction there.

Working toward an advanced degree in biochemistry at the University of Michigan is Evelyn Pease of Evansville, Ind. She has spent several summers working in her home town on new sulfa drugs with Mead, Johnson and Co.

Mary Ann Williams, Kingston, N. Y., worked at the Nylon Control Laboratories of the Du Pont Experimental Station before returning to Cornell University,

where she is doing advanced degree research studies in biochemistry.

Another nylon chemist is Julia Anne Wien of Esterly, Pa. She is studying the problem of color-fast nylon hosiery as a chemist with the Berkshire Knitting Mills, Wyomissing, Pa.

Top boy winner in the first Science Talent Search in 1942, Paul Teschan of Shorewood, Wis., is completing his M. D. degree at the University of Minnesota, where he also has taught nurses.

Working toward an advanced degree in chemistry at Cornell University is Wolt Karo, Utica, N. Y. His is the problem of measuring the rate of decomposition of certain catalysts used in making synthetic rubber.

These young scientists are typical of the Science Talent Search winners who have begun carving careers in science for themselves in less than half a dozen years since they were discovered as high school seniors.

Mrs. Gloria Lauer Grace, reared in Ames, Ia., has earned her Ph.D. degree in psychology in four school years, the time normally required to earn a bachelor's degree. Now married to a scientist, Mrs. Grace is teaching at Barnard



OBSERVING SUNSPOTS—Elizabeth Roemer's astronomical readings at the University of California at Berkeley are sent to the National Bureau of Standards where they are used to help forecast radio conditions.



TESTING RESPONSES—Mrs. Gloria Lauer Grace examines a boy at Columbia University while a group of his schoolmates crowd around.

College and has studied the learning responses of New York school children during her work at Columbia University.

A German refugee boy when he won a \$2,400 Westinghouse Grand Science Scholarship, Raymond R. Schiff of New Rochelle, N. Y., wrote an essay on the future of atomic energy. After studying nuclear physics at Harvard, he is now doing atomic experimental work at the Westinghouse Research Laboratories before returning to college.

Winners in Many Fields

The fields of science in which Talent Search winners may be found is broad. Some study the science of the things around them. Others, like Elizabeth Roemer of Alameda, Calif., look to the heavens. Miss Roemer, a winner last year, makes daily sunspot observations which help predict how well your radio will pick up distant broadcasts.

The effectiveness of the cooperation of industry with education in making available opportunities to the scientists of the future is demonstrated by the sponsorship of the Science Talent Search by the Westinghouse Electric Corporation through its Educational Foundation. This industry participates in this educational effort in much the same spirit that it supports fundamental science investigations in its research laboratories—confident that even if the new knowledge gained or the young scientists discovered do not work for Westinghouse, that or-

ganization will have helped advance the world's progress.

The Seventh Annual Science Talent Search will spotlight more young scientists of tomorrow who will graduate from high school in 1948. The Search is already on.

Entrant's Qualifications

Each student will submit his school record and recommendations, complete a three-hour science aptitude examination and report his own work in science in an essay, "My Scientific Project." Examinations will be given in the entrant's own high school on or after December 1.

From approximately 16,000 entries, 300 will be selected for honors. Of this group, 40 will come to Washington late in the winter as winners of the Seventh Annual Science Talent Search. The other 260 named for Honorable Mention will receive recommendations for scholarships to the colleges of their choice.

In Washington, at the Science Talent Institute, winners meet leading scientists, hear of new developments in science and visit important laboratories.

High school seniors working on scientific projects will be winners of this year's Science Talent Search. Ahead of them lie an exciting competition, honors, fame, education and a career in science which will add new proof that the Science Talent Search experiment can help find tomorrow's scientists today.

Science News Letter, November 1, 1947



Atoms, Planets & Stars

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- 1—The solar system to scale and the movements of the planets, etc.
- 2—A "Time Table" for rocket ships showing arrival time from the planet Earth.
- 3—The Elements, giving the melting and boiling points, density and atomic weights.
- 4—Comparative size of the sun to the orbit of the moon around the earth.
- 5—Comparative size of the star Betelgeuse to the orbits of the planets.
- 6—Sectional view thru the earth showing the pressure at earth's core, etc.
- 7—Twenty of the brightest stars and their distances.
- 8—Our solar system in a nut shell. Shows our relative distance to other stars.
- 9—Our location in the Milky Way Galaxy, and time to reach nearest star.
- 10—Curvature of the earth with comparative heights and depths.
- 11—A drawing showing the way of measuring the distances to near stars.
- 12—Showing movement of comet tails, and their paths thru outer space.
- 13—The Moon. Temperatures, distance, diameter and other information.

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(Please Mention SCIENCE NEWS LETTER)

Do You Know?

The *chemical industry* is sometimes divided into heavy, fine and organic chemicals; a heavy chemical, as the term is used applying to an industry, is one that is made and used in large quantities.

Cottonwood, balsam poplar and basswood are light-colored woods with which *aspen* lumber is often confused; the heartwood of aspen is white, while that of the others varies from a pale gray to a grayish brown.

Not many *airplanes* are designed to carry a load greater than their own weight; the Northrop Flying Wing, now under test, will be able to carry 120,000 pounds, it is claimed, in addition to its own 89,000 pounds.

A large manufacturing plant near Pittsburgh is drilling for *natural gas* on its own grounds in hopes of getting supplementary fuel in case of future fuel shortages.

Automobile engines, not perfect in combustion, produce from 1% to 13% carbon monoxide in their exhaust gases, recent tests show.

PHOTOGRAPHY

Speed up Movie Shots

Five million pictures a second can be snapped with a new perfected motion picture camera. This is claimed to be ten times as fast as any produced before.

► FIVE million pictures a second is the speed of a new motion picture camera. This is claimed to be 10 times faster than any high-speed camera produced before. When its picture of a rifle bullet is thrown on a screen at ordinary speed it takes a minute for the bullet to move one inch.

The new camera, developed at the University of Rochester's Institute of Optics, was revealed in New York to a group of scientists by Dr. Brian O'Brien and Gordon G. Milne, who are responsible for its development. An earlier version was used at the Bikini atomic bomb test, but it was a type that produced a continuous streak instead of an interrupted series of pictures.

The methods used to get this exceedingly high speed limit the quality of the pictures produced. They are far below ordinary motion picture standards, but serve for research and industry.

A film in a conventional type camera would have to travel 20 to 50 times the

velocity of a bullet to get several million frames a second. If the film is stationary and the image caused to move by rotating mirrors, the total number of frames, and thus the total duration of the motion picture, is quite limited. These difficulties are overcome in the new camera by a device which dissects the image, which later has to be reassembled.

The dissecting device breaks up the image of the rectangular picture into a series of very narrow strips which are drawn out by the film, which travels at a rate of 400 feet per second, into a streak. The variations in the photographic density at any particular place across this streak contain all the elements of a complete rectangular picture.

After processing, the negative is reconstructed into the original rectangular picture by projection back through an optical system similar to that which formed it.

Science News Letter, November 1, 1947

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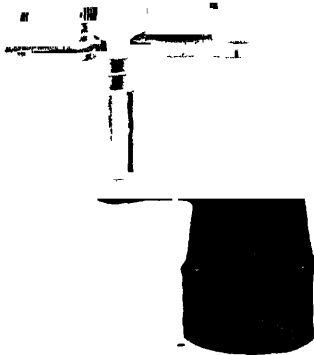
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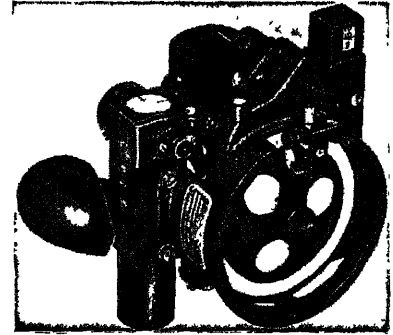
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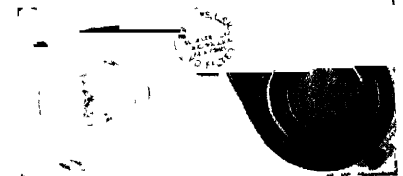
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THE ADVANCEMENT OF SCIENCE Vol. IV, No. 15—*British Assoc for the Advancement of Science*, 272 p., paper, \$1.90. This issue includes Sir Henry Dale's address on 'Science in War and Peace,' as well as other addresses in specific scientific fields. Available from Burlington House, London W. 1, England

AMPHIBIANS AND REPTILES OF THE PACIFIC STATES—Gayle Pickwell—*Stanford U Press*, 236 p., illus., \$4.00. Reptiles and amphibians of Washington, Oregon, and California are described thoroughly, and information on their life history, as well as their collection, care and handling, is included.

ANNUAL ENGINEERING UNDERGRADUATE AWARD AND SCHOLARSHIP PROGRAM—Free from: James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. A statement of rules and conditions of the contest.

CACHE LAKE COUNTRY: Life in the North Woods—John J. Rowlands—*Norton*, 272 p., illus., \$3.50. This story of life in the North Woods through twelve months of

a year contains valuable information on nature and woodcraft, and is enhanced by numerous drawings

THE CHEMISTRY OF ORGANIC COMPOUNDS—James Bryant Conant and Albert Harold Blatt—*Macmillan*, 3rd ed., 665 p., illus., \$5.00. The authors have introduced new physicochemical concepts and data without disarranging material included in earlier editions

COUNTRIES OF THE CARIBBEAN—*National Geographic Soc.*, 50 cents. The most recent in the series of maps of important areas of the world, made with the knowledge gained from wartime flights over the region. Available from Sixteenth and M Sts., N. W., Washington, D. C.

CONVECTION PATTERNS IN THE ATMOSPHERE AND OCEAN—R. B. Montgomery et al.—*N. Y. Academy of Sciences, Annals*, Vol. XLVIII, Art. 8, 140 p., illus., paper, \$2.00. This monograph deals with several aspects of a field that has received little attention despite its importance to man's environment.

DECENTRALIZE FOR LIBERTY—Thomas Hewes—*Dutton*, 238 p., \$3.00. The author sets forth in detail his view that, in order to achieve each citizen's maximum productive capacity, the United States must undergo a full decentralization—social, economic, and governmental, in physical plant, population, and individual responsibility

DIABETES AND THE DIABETIC IN THE COMMUNITY—Mary E. Tangney—*Saunders*, 259 p., \$2.75. This practical manual covers numerous phases of diabetes, offering guides to both diabetic nursing and the means of teaching the diabetic person to live in the community

FLAMEPROOFING TEXTILE FABRICS—Robert W. Little, ed.—*Reinhold*, American Chemical Society Monograph Series No. 104, 410 p., illus., \$6.75. A number of specialists have joined in presenting various phases of the wartime experiences in decreasing flammability of various military fabrics

FREE MATERIALS FOR SCHOOLS Their Significance and Source—Educators Progress Service—1 yr. \$17.50; 3 yrs. \$27.00 on 30-day billing, \$28.50 on 90-day billing, \$31.50 total for three annual payments. A guide to materials available free for the enrichment of school curricula, such as maps, bulletins, exhibits, books, magazines, radio scripts, etc., set up by topics in card-index form, and packaged in a metal case

GENERA FILICUM—Edwin Bingham Copeland—*Chronica Botanica*, Annales Cryptogamici et Phytopathologici, Vol. V., 247 p., illus., \$6.00. An up-to-date presentation of the taxonomy of ferns.

HANDBOOK OF PSYCHIATRY—Winifred Overholser and Winifred V. Richmond—*Lippincott*, 252 p., \$4.00. In language readily understandable to the layman, the authors describe the various types of mental disease, their symptoms, causes, and prognoses, with some general reference to therapy.

HORTICULTURE AND HORTICULTURISTS IN EARLY TEXAS—Samuel Wood Geiser—*South. Meth. Univ. Press*, 100 p., paper, \$1.00, cloth, \$1.50. Describes fruit culture in early Texas for the period chosen and also contains information concerning early horticultural societies and journals, a section is devoted to brief biographies of Texas horticulturists

TRUSTEE—American Hospital Assn., Vol. I, No. 1, \$3.00 per year. The first issue of a new journal for and about hospital governing boards. Available from: 18 E Division St., Chicago 10, Ill.

Science News Letter, November 1, 1947

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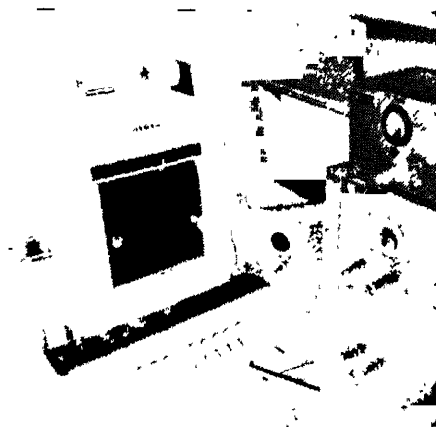
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The installation is jointly by the Navy, Air Force and the Coast Guard. It provides the United States with its first transcontinental radar airway. The route followed is generally used by military planes and, while the installation is primarily for such craft, it will be available for commercial transports.

Racon is a war development. The word is coined from radar and beacon. It is a system of short-range aerial navigation. The traveling plane sends out radar impulse which "trigger" the land-based station. The station responds in its identification code. This code appears on the radar scope or screen on the plane, from which the bearing and distance from the plane to the beacon can be read.

Racon airways have several advantages over ordinary radio-range routes. The principal one is that the pilot knows his position at all times. With the radio range he knows his direction only when directly "on the beam," and his location only when directly over a station or a radio marker.

Of the 50 stations on this route, the Navy will operate 22, the Air Force 14 and the Coast Guard 14. Additional Racon-routes are planned for the future, the next probably to be from Chicago to Seattle.

Science News Letter, November 1, 1947

Flax for *home fiber* was an early American colonial crop.

YOUR HAIR AND ITS CARE

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—American Journal of Physics

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Science News Letter, November 1, 1947

☼ **VALVE REGULATOR**, a plastic device to hold an inverted bottle of liquid floor wax on the front of a waxing mop and release liquid as needed, is operated by tipping the mop handle forward until the projecting top of the valve touches the floor. No wax leaks when the mop is held in working position.

Science News Letter, November 1, 1947

☼ **SAVINGS BANK** for children is an upright coin-size tube, standing on a supporting base, with a slot near the top through which the money is pushed. A movable arm on the tube enables one to determine when the height of the pile of coins is on a level with the top of the head of the child.

Science News Letter, November 1, 1947

☼ **IMPROVED WASHING** machine for automobiles, with seven giant-sized rotary power brushes with long fibers, and compressed air for drying, does a complete car-washing job in 90 seconds, it is claimed. The brushes are arranged to scrub all parts of the car at the same time.

Science News Letter, November 1, 1947

☼ **GRIP FINDER** for the golf club,



shown in the picture, is a plastic attachment held in place with adhesive tape. Molded with two impressions, it lines up both thumbs and keeps the hands together for firmer grip.

Science News Letter, November 1, 1947

☼ **BROKEN LINE DEVICE**, recently patented, for draftsmen who have constant occasion to draw lines composed of a series of short dashes, consists of a pencil-carrying carriage and a straight-edge. A cam in the carriage lifts the pencil point from contact with the paper at regular intervals.

Science News Letter, November 1, 1947

☼ **TRANSFORMERS** for photographers, designed especially for photo-flash use, are of two types, one for use from 110-volt lines and one for use with four or six-volt batteries. They provide a 2,200-volt direct current output and both are sealed in steel cases.

Science News Letter, November 1, 1947

☼ **SHOE POLISH APPLIER** has a hollow lengthwise cavity in its center to hold the paste and mechanical means by which a little may be ejected to a small brush on the front lower side of the device. The rest of the lower side is covered with a material for polishing.

Science News Letter, November 1, 1947

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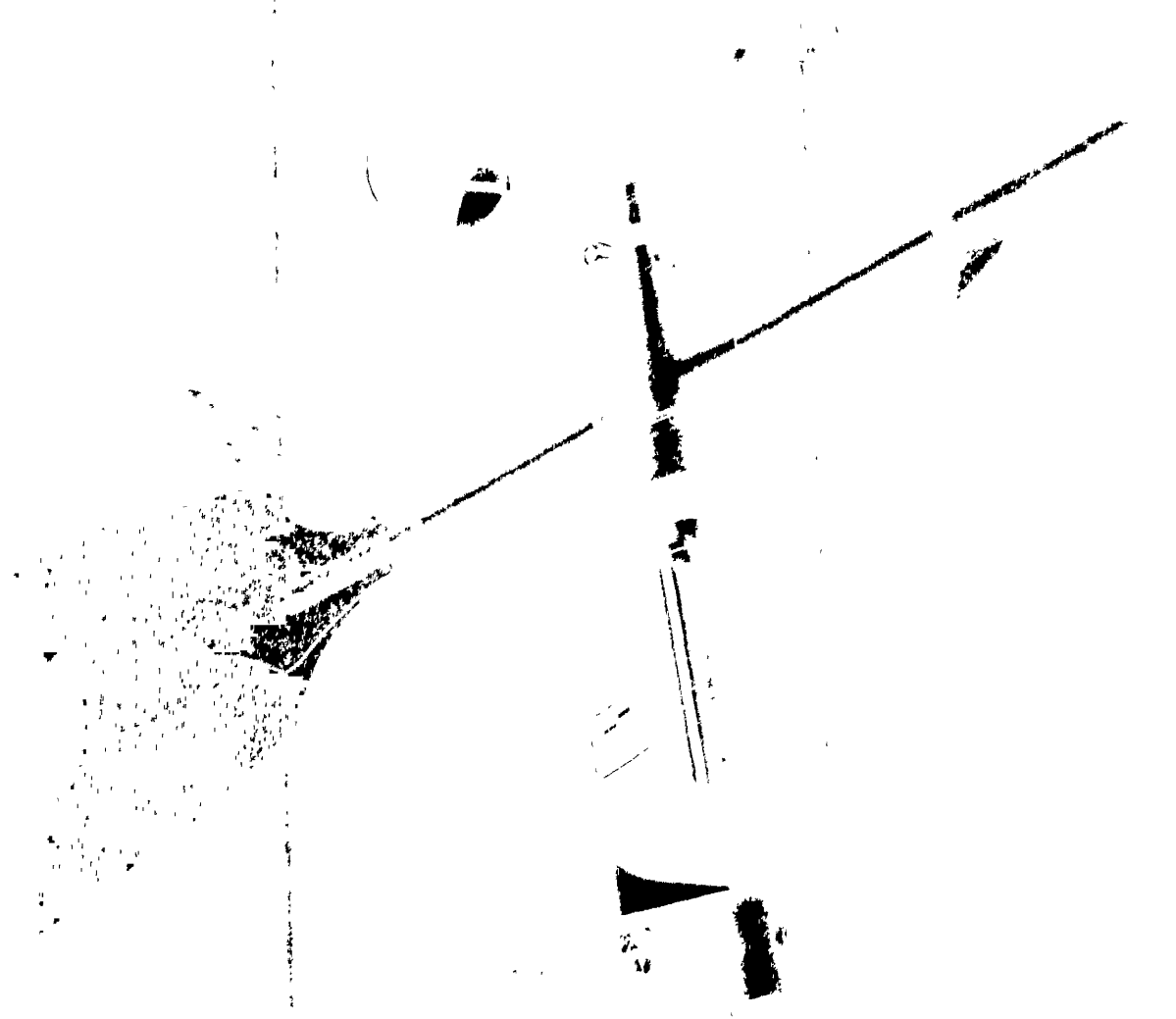
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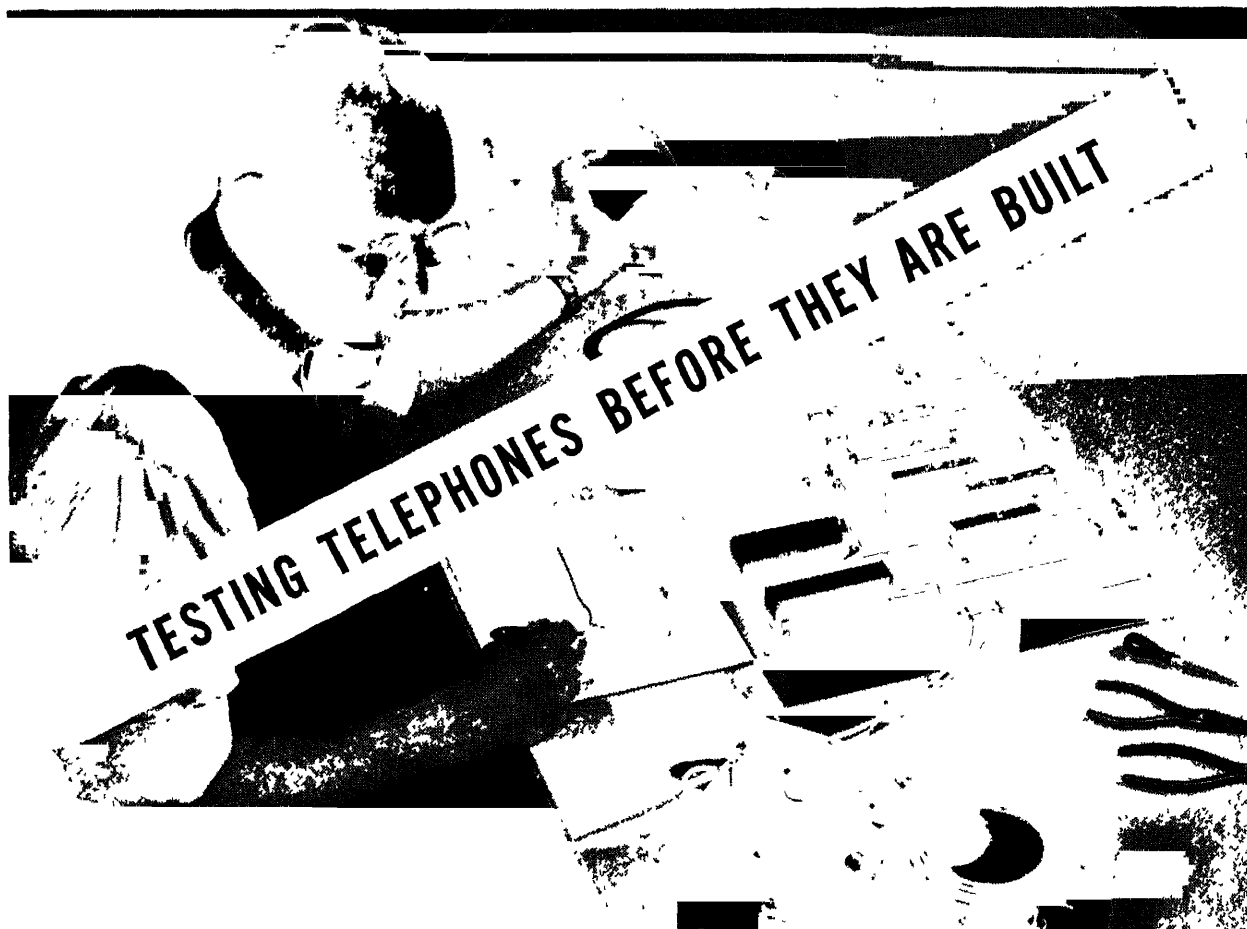
THE WEEKLY SUMMARY OF CURRENT SCIENCE • NOV. 5, 1967



A SCIENCE SERVICE PUBLICATION



YOUR TELEPHONE TRANSMITTER AND RECEIVER, voice gateways to the telephone plant, are so essential to satisfactory service that they have been under study in Bell laboratories for seven decades.



A TELEPHONE RECEIVER is a complex system of electrical and mechanical elements. Its coils, magnets, diaphragm and cap react on each other as they convert the electrical waves of your voice to sound waves. What is the best size for the holes in the ear cap? Will 1/1000th inch greater thickness help a receiver diaphragm to carry your telephone voice more clearly? One way to find out is to build numerous experimental receivers and test them.

But Bell Laboratories have found a shorter way. They built an all-electrical replica, an "equivalent circuit" in which electrical resistance stands for air friction in the

cap holes, capacitance corresponds inversely to the stiffness of the diaphragm. Performance of this circuit can be quickly measured and design changes economically explored. Later, a model can be built and checked.

The "equivalent circuit" was pioneered by Bell Telephone Laboratories 25 years ago. It is a useful tool in many Laboratories developments—saving time, saving the cost of machine-tooled models, encouraging experimentation. It is one more example of the way Bell scientists get down to fundamentals as telephone progress continues—and service keeps on improving for all subscribers.



BELL TELEPHONE LABORATORIES

EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

MEDICINE

New Mold Remedy Found

Chloromycetin from soil belongs to the penicillin-streptomycin family. It is effective against the typhus and spotted fever group as well as parrot fever in lab tests.

➤ A NEW streptomycin-like remedy from a mold has been dug out of the earth. Epidemic typhus fever, Rocky Mountain spotted fever, scrub typhus and parrot fever, or psittacosis, are among the serious diseases which may be conquered by this newest member of the penicillin-streptomycin family of drugs.

Chloromycetin is its name. It was discovered by Dr. Paul Burkholder of Yale University in a sample of soil from a mulched field near Caracas, Venezuela. The sample of earth was one of hundreds collected from all over the world in a search for molds and fungi that might yield disease remedies.

Discovery of chloromycetin and preliminary tests of it are reported by Dr. Burkholder and Drs. John Ehrlich, Quentin R. Bartz, Robert M. Smith and Dwight A. Joslyn, of Parke, Davis and Co. Research Laboratories in the journal, *Science*, (Oct. 31).

Its effectiveness against the typhus and spotted fever group and parrot fever discovered by Drs. J. E. Smadel and E. B. Jackson at the Army Medical Department Research and Graduate School, Washington, is reported in the same scientific journal.

The Army studies were made with infected chick embryos and mice. Tests on patients have not yet been made and may not be completed for a year. Further lengthy and careful tests on laboratory animals must come first to learn whether chloromycetin is safe or too poisonous to give patients. Then enough of the chemical must be extracted from its earth mold producer to treat patients on a trial basis.

So far, the chemical seems safe. Large doses did not harm the mice and it could be given them either by mouth or by hypodermic injection. Excellent results were obtained even when the chemical was given as long as 10 days after mice had been infected with the typhus fever germs.

Rickettsialpox, a new disease discovered in New York last year, may also be treated successfully by chloromycetin, the Army laboratory studies suggest.

The good results in parrot fever are

impressive because this disease is caused by a virus and virus diseases, from the common cold to infantile paralysis, have been practically untouched by mold remedies or other chemicals. Chloromycetin was tried in mice with another virus disease, Japanese encephalitis, a kind of so-called sleeping sickness. It was not effective. Nor did it stop influenza A virus in chick embryos. It was also ineffective against smallpox virus in fertile hen's eggs.

Science News Letter, November 8, 1947

NUCLEAR PHYSICS

Rare Isotope of Helium Can Now Be Concentrated

➤ A RARE form of helium can now be concentrated by a single-step process, Ohio State University has revealed. It is

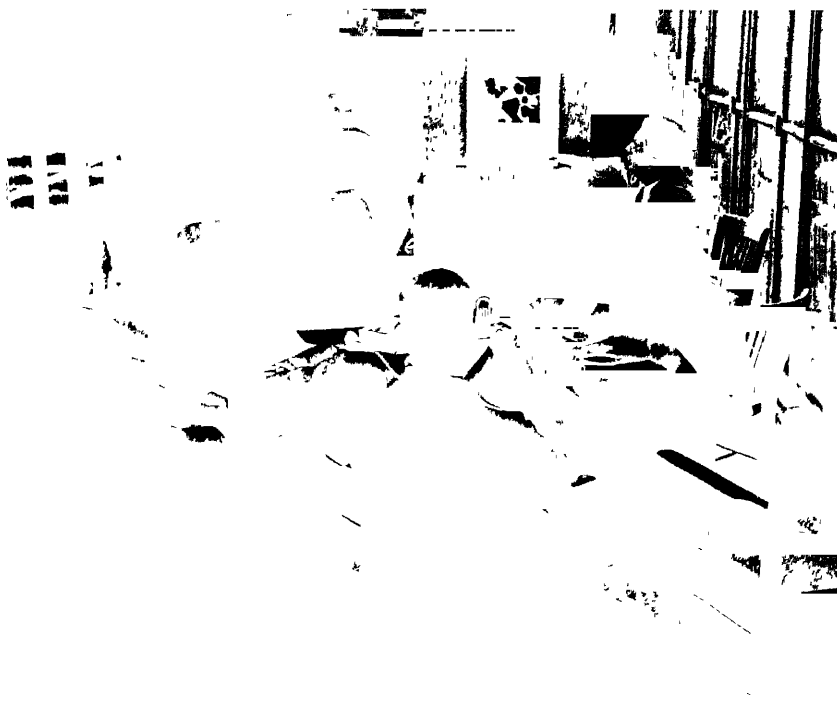
a process carried out at a temperature some 450 degrees below zero Fahrenheit at which ordinary liquid helium takes on some peculiar properties.

Helium is the exclusively American non-combustible gas used in balloons. It is extracted from natural gas in Texas and New Mexico. The newly concentrated form is the mass 3 isotope of the substance, which exists normally in the proportion of only one part to a million of the normal mass 4 isotope. Isotopes are forms of the same element which differ in mass but are ordinarily identical in other characteristics.

At extremely low temperature, down close to absolute zero which is approximately minus 460 degrees Fahrenheit, liquid helium has the ability to climb up the walls of its container. The single-step process depends on this property. The ordinary mass 4 isotope climbs, the mass 3 isotope remains behind, thus becoming concentrated.

The discovery was made by Drs. J. G. Daunt, R. E. Probst and H. L. Johnston, of the university staff, working on a helium project for the Office of Naval Research. The new process will probably be of value in the nuclear field.

Science News Letter, November 8, 1947



JUDGING ENTRIES—How the winners were picked for the Photography in Science Exhibition being held at the Smithsonian Institution Nov. 1-30. Its purpose is to extend the possibilities for developing photography as a basic tool in research and teaching. [See pages 294 and 295.]

GENETICS

Mendel Shrine Wrecked

One bomb destroyed a part of the monastery in Brno, Czechoslovakia, where priceless mementoes of the great geneticist were kept.

➤ ONE SHELL—whether German or Russian nobody knows—made a wreck of the Mendel shrine in the monastery in Brno, Czechoslovakia, where priceless mementoes of the great geneticist were kept. Other, equally priceless Mendelian, especially the manuscripts that were the foundation-stones of modern genetics, were stolen by the Nazis from the archives of the Natural History Society, before which Mendel first presented the results of his researches. It is known that these were paraded around Germany, but what has become of them has not yet been found out.

This story of disaster to the relics of Gregor Mendel is told in the *Journal of Heredity* by Hugh Iltis, a science student at the University of Tennessee, who was for a time with the U. S. Army of Occupation in Germany. Mr. Iltis' father, Prof. Hugo Iltis of Mary Washington College, was a native of Brno, and has devoted years of study to the life and works of Mendel. So when opportunity offered, the younger Iltis made a journey to Brno to see for himself what had happened to the city and to the monastery where Mendel had once raised his little garden of very important peas and where he subsequently ruled as abbot.

The city had been pretty severely battered during the last days of the war, though it is now patiently being rebuilt. At first sight nothing seemed amiss with

the monastery, but Mr. Iltis soon learned otherwise. Only one shell had hit the entire large structure—but it had crashed right into the room where the Mendel shrine was housed, demolishing practically everything in it and leaving a large hole where wall and roof joined, through which the weather had wrought further mischief.

Elsewhere, both within and outside the monastery, things associated with Mendel were unharmed, save for the looting of the Natural History Society's headquarters. The beautiful white marble statue of the great geneticist that dominates city square dedicated to his memory remains unmarred. A pear tree and an apricot grafted on a plum, both of which Mendel is believed to have planted in the monastery grounds, were in full fruit. The little plot where he worked with his peas was bright with flowers.

The Nazis tried to make much of the German parentage of Gregor Mendel, states Mr. Iltis, even going to the length of issuing a postage stamp, with his portrait on it. But he is sure that had Mendel been alive at the time he would have had none of these dubious honors. He feels quite convinced, on Mendel's known record as a stubborn defender of human dignity and rights, that he would have been another German prelate driven into exile or cast into a concentration camp

Science News Letter, November 8, 1947

NUCLEAR PHYSICS

Mesotron Photographed

➤ ONE of the most elusive and mysterious of the subatomic particles, the mesotron (alias meson) has been photographed. The mesotron itself got away, for it lived only a fleet fraction of a second and then disintegrated into two other particles, one a well-known electron and the other either a photon (a glob of light) or a neutrino, a little neutral particle about which little is known.

A team of California Institute of Technology physicists, consisting of Drs. Carl D. Anderson (Nobelist), Raymond V.

Adams, Paul E. Lloyd and R. Ronald Rau, report the photographic feat accomplished in a "cloud-chamber" device aboard a high-flying B-29 cruising nearly six miles above the earth.

The purpose of this sub-atomic photography, they explain in a report to the *American Physical Society*, (Oct. 15) is to discover the mass and the disintegration products of the mesotron, which is one of the many steps necessary in exploring the changes in matter and energy when cosmic rays bombard the

earth. Mesotrons are created by the powerful cosmic rays and so far man-made radiation has not been powerful enough to duplicate the effect of the cosmic rays.

The Cal. Tech photographs suggest that the incoming mesotron is about 200 times as massive as the familiar electron and that the neutral particle resulting from its disintegration has a mass 50 to 60 times that of the electron. There is also a hint that there may be neutrally uncharged mesotrons lurking about somewhere in the subatomic picture.

Science News Letter, November 8, 1947

The lubricating value of oil is due to its chemical structure and composition, not to its viscosity.

SCIENCE NEWS LETTER

Vol. 52 NOVEMBER 8, 1947 No. 19

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS

Subscriptions—\$5.00 a year, two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439.

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MEDICINE

Mice May Help TB Fight

Their reactions to infection by tuberculosis germs help scientists to get a better idea of what happens to human victims of this still deadly plague.

➤ MICE may become mankind's most useful allies in the war against tuberculosis, Prof. Rene Dubos of the Rockefeller Institute for Medical Research declared in a lecture given in Baltimore before the Johns Hopkins University chapter of Sigma Xi.

Their reactions to infection by TB germs help scientists to get a better idea of what happens to human victims of this still deadly plague, with better hopes of eventually sending it into the limbo of once devastating but now nearly extinct diseases like smallpox and typhoid fever.

It has been discovered that mice have hereditary differences in their susceptibility to tuberculous infection. Since mouse lives are cheap, these little animals can be used freely in an effort to throw light on resistance and susceptibility in our own species.

"It has also been found that all strains of mice become more susceptible to tuberculosis as a result of a concomitant infection with the influenza virus, or following physiological disturbance caused, for example, by nutritional deficiencies," said Dr. Dubos. "This suggests that mouse tuberculosis, a disease well adapted to laboratory analysis, may serve as a useful tool for the study of human tuberculosis."

That tuberculosis does call for intensive study is well attested by the fact that it is still the greatest single cause of death in the 15-40 age group, despite a steady decline in its death rate for the past 75 years. Before that, there had apparently been a steep rise in TB mortality, perhaps connected with the crowding into cities of great masses of the ill-fed, ill-housed poor brought about by the Industrial Revolution. Gradual amelioration in the laboring population's living conditions has been credited with the falling off in the tubercular death rate.

Industrialization of tropical countries is just getting fairly under way, the speaker pointed out. Tuberculosis is still a very serious disease in the tropics, especially in Latin America; it will be necessary to gain a conqueror's knowl-

edge of tuberculosis soon, if the tragic conditions of northern Europe and eastern America a century ago are not to be repeated in lower latitudes.

Science News Letter, November 8, 1947

ELECTRONICS

VT Fuze Creates Problem As Great as Atomic Bomb

➤ THE VT fuze, better known to laymen as the war-developed proximity fuze, poses problems to military field forces as difficult to solve as does the atomic bomb.

The statement is made by Lt. Col. F. P. Henderson, USMC., director of the Marine Field Artillery School at Quantico, Va., in *Ordinance*, (Nov.-Dec.) official publication of the Army Ordinance Association.

The VT fuze is a weapon of today, he says, and will be present on the battle fields of the future whether the atom bomb is there or not. This electronically operated fuze, used first in anti-aircraft warfare, is carried in the nose of a bomb or shell and is triggered to cause their explosion at the proper distance from the target by electric pulses which are sent out by it, and reflected back to it by the target.

It used by an enemy in a future conflict, the Colonel declares, the VT fuze will prove deadly to American troops for it will unfailingly detonate a shell at the optimum height above the target, thus nullifying the protection of the open foxhole or gun emplacement by spraying shell fragments into it.

"What we must provide," he continues, "is complete splinter-proof protection against VT fire from artillery, mortars, naval guns, or close-support aviation to all elements of a military force, whether it is defending or attacking. To provide this protection without hampering the mobility of troops will be one of the most knotty problems that science, industry, and the armed forces will be called upon to solve."

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ATOMIC POWER PLANT—The basic parts are shown in this model being inspected by Dr. Kenneth H. Kingdon. At the left is the atomic "pile" where matter is transformed into energy. The striped rods projecting horizontally represent the control rods which would prevent the process from running away. A heat exchanging fluid would be pumped through the pile, thence to the heat exchanger on the right, where water would be turned to steam.

MEDICINE-GENETICS

Fire Slows Cancer Study

The Jackson Memorial Laboratory which was destroyed at Bar Harbor, Me., supplied many laboratories with specially bred mice needed for cancer research.

➤ **CANCER** research will be slowed for years to come as a result of the disastrous fire at Bar Harbor, Me. The flames that burned millionaires' villas brought loss to the entire world when they destroyed the modest brick building that was the Roscoe B. Jackson Memorial Laboratory.

Cancer researchers in countless laboratories depended on the Jackson Laboratory for the specially bred mice needed to test possible cancer cures and to probe deeper for knowledge of the causes of cancer. The Jackson Laboratory was furnishing some 50,000 mice a month to other laboratories.

In this mouse metropolis of 100,000 or more inbred mice were some that always, generation after generation, developed cancer of the breast. Other strains had been bred to develop cancer of the lungs, of the ovaries, of the liver and of the adrenal glands. Mice of the same strains, fortunately, are living in other laboratories now and can be bred to produce more of the same strains. But it will be at least two years before there are anything like enough of them. Meanwhile, cancer research projects all over this country and perhaps in other parts of the world will be stopped for lack of mice.

Irreplaceable, if it has been destroyed, is the unique collection of mouse genes, said to be the best in the world, which had been collected in the Jackson Laboratory. This collection was being used to study the location of the genes, or units of heredity, involved in cancer.

The Jackson Laboratory, besides its place in cancer research, was known as the mammalian genetics center of the world. Material accumulated for 45 years may have been lost. Other laboratories, even if they bred mice, did not keep the genetic material they developed, letting all of it be housed in the Jackson Laboratory.

This laboratory has contributed more fundamental information on cancer than any other laboratory in the world, one authority has declared. It was here that the milk factor in breast cancer was discovered. This factor, believed to be a virus, is present in the mouse mother's

milk and causes cancer in baby mice that suck the milk.

Here also were done fundamental studies on genetics, or inheritance; on the inheritance of size; on tumors of the adrenal glands which gave important information on the body's glands as well as on cancer.

Here transplantation of ovaries from one animal to another was first done and extensive studies made on transplantation of single eggs from the body of one mouse to another. If the animals in this study have been lost, it will be eight or ten years before the loss can be made up, because many of the animals are only now maturing and going on to the cancer age when they could give information for the fight against human cancer.

The Jackson Laboratory was founded by Dr. C. C. Little, its director, with money given by Mrs. Roscoe B. Jackson in honor of her husband, president of the Hudson Motor Co., who died of cancer.

One ray of hope is held by cancer researchers in the midst of their shock at the tragic loss to science and humanity in Bar Harbor. This is that someone may be inspired by the loss to give funds not only to rebuild the laboratory but to endow it so that it would be freed of the struggle for funds that has plagued it in the past.

Science News Letter, November 8, 1947

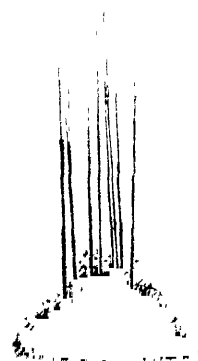
PHYSICS

New Instrument Measures Rocket Gas Temperature

➤ **NEW** instrument for "taking the temperature" of the exhaust flame of a rocket was revealed at the annual meeting of the Optical Society of America in Cincinnati.

The new instrument, called an absorption-emission pyrometer, will open up new research into rocket power by solving a difficult problem for scientists studying rockets.

Thermometers and other standard temperature-measuring devices are destroyed by heat of the exhaust flames,



SUPER-BAZOOKA EXPLOSIONS

—From hollow-ended charges in anti-submarine bombs they sent jets of flame to a height of 250 feet. These "hard" flames were each capable of piercing 23 inches of steel armor-plate, just as the jets from the much smaller charges in wartime bazooka projectiles could pierce the three or four inches of armor carried by a heavy tank. This photograph, which shows a group of these mines being fired simultaneously to test for mutual interference, won first prize in the color division of the first international competition in scientific photography. It was made by Dr. Thomas C. Poulter, associate director of the Armour Research Foundation.

which may be as high as 4,000 degrees Fahrenheit. Sodium line reversal, another technique for the measurement of the temperature, by spectroscopic means, requires addition of special materials to the fuel and an observer in a dangerous position near the motor.

Donald H. Jacobs of the aerophysics laboratory of North American Aviation, Inc., explained that his new pyrometer measures the temperature of the exhaust gases with an accuracy of one percent.

Two beams of light reaching a photoelectric cell are used in the instrument. One beam passes through the exhaust flame of the rocket, while the other reaches the photoelectric cell through a series of mirrors. Comparing these beams of light, scientists can calculate the temperature of the exhaust gases.

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AGRICULTURE

Cornstalks Yield Sugar

Inbred corn, known as Connecticut 103, may open up a vast new source of sugar since its stalk has about 11 % sugar in it and it produces good ears of corn.

➤ SUGAR from cornstalks may open up a vast new source of sugar in America's cornbelt if a corn plant developed at the Connecticut Agricultural Experiment Station is grown.

The new sugar-producing cornstalk is on a corn inbred known as Connecticut 103. It produces good ears of corn. The wood-like stalk has more than 11% sugar in it.

Stalks of 103 were found to be sweet by Dr. W. Ralph Singleton, geneticist at the station. He made chemical analyses which revealed 8.65% sucrose, or natural sugar, plus more than 2% of other sugars. The natural sugar content of sugar cane varies from 10% to 15%.

Scientists have known for a long time that cornstalks contain sugar, but stalks have never been considered a potential

competitor to sugar cane. If the ears are removed before they mature, the stalk contains more sugar than normally. But this loses the ears of corn, main product of the corn plant.

Now, Dr. Singleton believes that it may be possible for the farmer to have his ears of corn and get sugar from the stalks after the ears are picked.

Today's corn sugar and corn syrup are not natural sugar. They are made chemically by converting the starch in kernels of corn into sugar.

At Beltsville, Md, scientists of the U. S. Department of Agriculture said that they were not familiar with his work. They suggested that the increased sugar content of the cornstalks might make the stalks better feed for the animals which normally eat the fodder made from them.

Dr. Singleton plans to continue his corn study next season. He suggests that sweet-stalk corn might be introduced into commercial field-corn hybrids. If it is, harvesting and processing problems would have to be solved before a new supply of sugar from cornstalks would be available.

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METEOROLOGY

Supercooled Cloud Needed To Produce Rain or Snow

➤ "RAINMAKING" is not as simple as it sounds. "Producing snow or rain artificially constitutes something more than merely dropping dry-ice out of an airplane," cautions Vincent J. Schaefer, General Electric scientist who originated the cloud-seeding method.

First job in producing rain or snow is finding the right cloud. If you drop dry-ice on just any cloud, it may rain or snow. But more times than not, nothing will happen. The cloud must contain moisture which is liquid despite the fact that the temperature is below freezing.

These clouds, called "supercooled," can be spotted by the appearance of icing on the plane, by measuring the temperature or by other optical effects.

The scientist revealed that some earlier attempts at rain production over a forest fire area failed because the clouds were not supercooled.

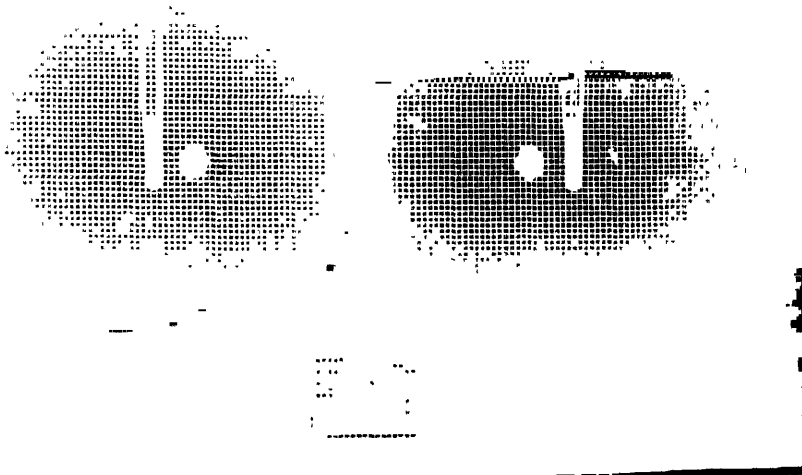
When you have spotted a likely cloud, dumping dry-ice out of a plane will not make either rain or snow. Mr. Schaefer calls his method "seeding." This distributes small bits of dry-ice over the cloud. If you toss a big chunk of dry ice out of a plane into a cloud it will probably drop right through the cloud without so much as a light shower or snow flurry.

Recommended recipe for seeding a cloud is about one pound of dry-ice per mile and a half of cloud.

Even with the proper seeding of a supercooled cloud, no welcome precipitation may reach the earth. If the atmosphere is too dry below the cloud, rain or snow may evaporate before they hit the ground.

If nature is cooperative and you follow the directions, you may get rain. But don't expect a cloudburst. A cloud two miles thick with a minimum supercooled portion at least 500 feet thick will only produce .14 of an inch of rain or 1.5 inches snow.

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MOSQUITOES CAN SMELL—Females of the yellow fever mosquito responding to the odor of a man's arm at the right of an insect olfactometer. In both sections the temperature, humidity, rate of air flow and extraneous odors were practically the same but the odor of a man's arm was added to the right side. This is the first of 10 pictures exposed at one minute intervals that comprise one test. Submitted by Dr. Edwin R. Willis, of the Ohio State University, it won first prize in the black and white section for scientific photography.

DENTISTRY

Dentist Suggests Formula To Check Tooth Decay

➤ A 3-3-3 formula for checking tooth decay has been developed by Dr. Chester J. Henschel, New York dentist. The formula is:

No eating between meals. Cleanse teeth for three minutes three times a day within three minutes after eating.

For the cleansing he advises a tooth powder containing carbamide, di-ammonium hydrogen phosphate, bentonite, sodium lauryl sulfoacetate, precipitated calcium carbonate, saccharin and methyl salicylate.

The first two ingredients are probably the most important, since the carbamide acts to prevent acid formation and the phosphate liberates ammonia which apparently is effective in checking tooth decay. The importance of ammonia comes from studies showing that persons who are immune to tooth decay have more ammonia in their saliva than persons susceptible to decay.

Following the 3-3-3 formula is "strict and difficult," and the ammonia-generating tooth powder is not a panacea, Dr. Henschel admitted in reporting it to the Tufts College Study Club. With "average cooperation and use" the artificial immunity to tooth decay created by the ammonium compounds may only amount to from 5% to 25%. But patients are encouraged by the pleasant-tasting, cleansing and potentially remedial tooth powder to spend more time cleansing their teeth.

Encouragement for using this new kind of tooth powder which promises to do more than merely clean the teeth is found, Dr. Henschel pointed out, in recent action of the American Dental Association. That organization has abandoned its former policy of rejecting any tooth powder or paste that claimed treatment or remedial properties and has admitted the probability that some acceptable ones are or soon will be available.

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DENTISTRY

Discover Small Amount of Citric Acid in Saliva

➤ IF anyone calls you a "sourmug", be not over-hasty with your retort discourteous. You are one—slightly at any rate—if you are physiologically normal. Citric acid, the stuff that makes lemons

sour, is present in human saliva, though in very low concentration.

Dr. Isadore Zipkin of the National Institute of Health has measured the citric acid concentrations in 180 saliva specimens contributed by 15 men, who chewed wads of paraffin to insure adequate production. (*Science*, Oct. 17.) The concentrations were very low, ranging from less than four to slightly over 20 parts of citric acid per million parts of saliva. The same individual showed considerable variation during the day, with highest concentration usually around noon.

Although salivary citric acid is small in amount, it may be potent in the mischief it can cause, Dr. Zipkin points out. Combining with the calcium of the teeth to form a highly soluble compound, it may play a considerable role in the production of dental caries.

Science News Letter, November 8, 1947

PLANT PHYSIOLOGY

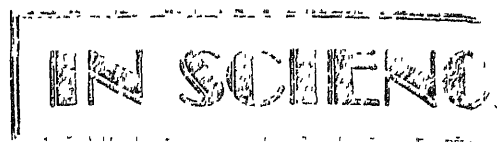
Radioactivity Produces Changes in Plant Cells

➤ CHANGES in the developing male sex cells of plants have been produced for the first time with radioactive phosphorus taken up in water absorbed by the plants, in experiments carried out by Dr. Norman H. Giles, Jr., Yale University botanist. They may open the way to a new technique for producing evolutionary changes, and they definitely suggest caution in handling plants to which radioactive elements are being fed as part of their mineral ration. (*Proceedings of the National Academy of Sciences*, Oct.)

The plants used were a species of spiderwort—plants of open, sunny, moist places, with grass-like leaves and rather small, three-petaled blue flowers. Stems with groups of buds were cut off and placed in water containing a dissolved salt of radioactive phosphorus. They were inserted through holes in lead shields, to make sure that radiations direct from the solution did not reach the buds.

At intervals, buds were opened, and the cells that would have developed into pollen grains were examined under the microscope. Changes were evident in the chromosomes, or heredity-bearing structures, of a substantial number of the cells, the percentage of the total increasing with the length of time the stems had been absorbing the radioactive phosphorus.

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METEOROLOGY-AERONAUTICS

New Instruments Measure Visibility in Fog

➤ HOW far the normal eye can see in fogs of varying densities can now be measured by a new instrument developed by the National Bureau of Standards. It is a visibility-measuring device called a transmissometer, designed for use at airports to decrease the human factor in visual estimates of distance.

The instrument has another important possible use in aviation. It is expected that it can be employed to control high-intensity airport approach lights, and also to control fog-dispersal equipment, such as the British FIDO system, by which fog is lifted by the heat from burning troughs of oil.

The transmissometer consists of a light transmitter, a photo-tube receiver, an amplifier and an indicator. The light transmitter and receiver are separated by a distance sometimes as great as 4,000 feet. The amount of light that reaches the receiver is determined by the fog density or other atmospheric conditions in a direct line between the two pieces of equipment. The light falling on the photo-tube in the receiver sets up an electronic circuit whose output is an electric current that varies exactly as the amount of light received.

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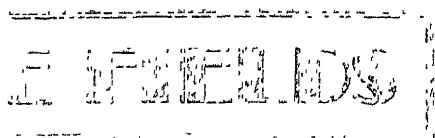
ORNITHOLOGY

Birds That Shine at Night Reported by Observers

➤ BIRDS that shine in the dark with a phosphorescent light like that given off by some fish and other sea creatures, are the near-incredible rarity reported by Dr. W. L. McAtee of the U. S. Fish and Wildlife Service. He has gathered the statements of a considerable number of reliable observers, who declare that they have seen the phenomena in such diverse birds as barn-owls, night-herons and Australian finches.

Dr. McAtee has not yet been able to discover what causes the light, but he suspects it comes from luminous bacteria or fungi eaten by the birds or attached to their tissues.

Science News Letter, November 8, 1947



CHEMISTRY

New Product Makes Jelly On Addition of Water

➤ JELLY without fuss or muss is promised to the housewife in U. S. patent 2,429,660, just issued to Alexander M. Zenzes of New York. In its finished form his preparation is a caked granular powder, which only requires the addition of water and flavoring, or of fruit juice instead. It doesn't even need to be boiled.

To prepare it, a thick sugar syrup is made up, and pectin added. Pectin is the stuff that makes jelly jell; it is prepared commercially from good but unmarketable fruit. After the pectin addition the syrup is re-concentrated; then tartaric acid or some other food acid is added.

As finally simmered down, the product consists of sugar crystals, each surrounded with a film containing sugar, pectin and food acid, plus about 10% of water. Its most convenient marketable form is as blocks or bricks, which need only to be dissolved in water and let stand a little while to make firm jelly.

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SAFETY

Two-Minute Firefighters Cut Toll in Air Crashes

➤ "TWO-MINUTE MEN", who form rescue crews which aim at removing air crash victims from burning planes in two minutes, are saving lives in both military and civilian air accidents, the Navy reported.

Using fog-foam firefighting equipment, the crews are being trained to rescue all persons in crashed planes at naval air fields within two minutes of the crash. In a recent crash of a Pan-American Airways transport at Floyd Bennett Field, New York City, a Navy crew controlled the flames to permit 41 passengers and crew members to escape unhurt, the Navy said.

When a plane crashes, trucks bring Navy firefighting and rescue equipment to the plane. Fog-foam equipment is used in three different ways to control the fire. If there is no fire at the moment of the crash, a water spray is used to cool the air to prevent combustion. If a fire

is burning, a heavy foam generated with water and a mechanical foam compound are sprayed to smother flame. In some cases both the foam and cooling spray are used.

Streams of low-pressure fog-foam are used on the center of the flame, with low-pressure foam and carbon dioxide on the outer edges.

A path is cleared for rescuers who enter the cockpit and cabin with special tools.

Latest Navy crash equipment includes the model FFN-5 truck, which carries 800 gallons of water and 80 gallons of mechanical foam compound. As much as 4,000 gallons of foam can be sprayed on a fire in one minute with this equipment.

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SAFETY

Fog-Foam Used to Fight Fire on Navy Ships

➤ FOG-FOAM firefighting systems are being installed on a number of Navy aircraft carriers and firefighting tugs. They are expected to reduce greatly the danger from gasoline fires aboard ships.

Gasoline fires are hard to extinguish by ordinary firefighting methods. The use of fog-foam, instead of water, has been found successful. The foam is a smothering mass of snowy bubbles which lasts for hours and can be spread several inches thick by use of special nozzles to seal inflammable gases and keep oxygen out.

This mechanical foam is made from soybeans, fish scales and iron salts. It is carried aboard ship in special containers but is mixed with water in use. Its adhesive qualities make it stick to anything; a gale will not blow it away, and it can be laid in dikes to confine a gasoline fire.

* A special nozzle developed for the Navy can be adjusted to throw a solid stream or to send the water through jets to produce a fine mist-like spray. The advantages of fog lie in its superior heat absorption, its use of small quantities of water, protection of firefighters from heat, and reduced water damage.

A further use of mechanical foam is in fighting above-the-ground oil tank fires. The foam is pumped into the tank through the oil pumping line itself at the bottom of the tank, rises through the oil, cools the oil below ignition temperature, and kills the fire. In this application the foam cools rather than smothers the fire.

Science News Letter, November 8, 1947

GENETICS

X-Rays Alter Heredity of Dried, Inactive Bacteria

➤ EVOLUTIONARY changes have been produced by X-rays in bacteria that were in a dried, inactive state, a three-man research team at the Hannah Dairy Research Institute in Kirkcubbin, Scotland, report in the science journal, *Nature*, (Oct. 11) published in London. Hitherto such hereditary changes induced by X-rays have been in organisms that were fully alive and functioning at the time of exposure.

The bacteria used in the experiment were isolated from some dried milk; they belong to the species technically known as *Bacterium aerogenes*. Among the hereditary changes induced were differences from the parent strain in the kinds of food substances they were able to use. The X-ray treatment apparently altered in some way the production and use of certain enzymes or digestive ferments.

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ZOOLOGY

Chimps Have Keener Sense of Smell than Man

➤ CHIMPANZEES have a keener sense of smell than man. This finding, contrary to previously held scientific opinion, is reported by Thomas M. Blackman of Honolulu. (*American Journal of Physical Anthropology*).

Failure to take into account the chimpanzee's intelligence has misled previous observers into believing the chimp lacked a sense of smell.

When a chimpanzee pays no attention to an odor, it is because it is familiar to him and he takes it for granted, just as a man would, Mr. Blackman observes. But an unknown odor, even if too faint for a man to detect, will arouse the chimpanzee's fear.

His own three chimps refused to sleep on blankets that had been dried near a peculiar kind of paint, because the blankets had absorbed the odor of the paint. But they did not detect oranges hidden for the first time in their cages, because they were familiar with the orange odor. Similar observations over a period of five and one-half years have convinced Mr. Blackman that the intelligence of chimpanzees must be taken into account in studying them.

Science News Letter, November 8, 1947

METEOROLOGY

Unmanned Weather Stations

Experimental ground-stations and balloons are being used to report weather automatically. Land-based units are able to operate some two months without attention.

By A. C. MONAHAN

See Front Cover

► **AUTOMATIC** weather reports will serve weather bureaus of the future with up-to-the-minute data for use in weather forecasting. They will come from thousands of isolated and widely separated stations from the Arctic to the Antarctic.

They will provide information from weather-breeding regions from which no reports are now received. They will need no attending crew. Reports will go on the air at regular intervals in radio code.

A few such stations are already in use experimentally, both in frigid and tropical climates. Their usefulness has been proven. Maintenance crews visit them every two months or so. Their reports are sent without further help from man, and they are given at the intervals for which the mechanism is set.

First Operating Model

The U. S. Weather Bureau, the National Bureau of Standards, the Army and the Navy have all had a part in their development. They are war-products, one might say, but work on them was started as early as 1935 by the National Bureau of Standards, under sponsorship of the Navy. The first operating model was completed in 1941 by the Bendix Aviation Corporation at Towson, Md., and several were placed in operation in the Pacific area the next year.

The United States is particularly interested in frequent reliable weather reports from stations along the Arctic Circle from the western Aleutian islands, across Alaska and northern Canada, Baffin island and Greenland. It is along this stretch that many storms breed that effect future weather in the north Pacific, continental United States, and air and surface shipping routes to Europe.

In developing these automatic reporting stations, lessons were taken from radiosonde. This method of obtaining weather data from high above the earth's surface, particularly for the benefit of aviators, is about a decade old. It, however, did not come into extensive use

until during the war. It is now used regularly by the Weather Bureau, the Army and the Navy, the information obtained being interchanged.

In radiosonde, battery-operated electrical observation and radio-reporting instruments are carried high into the atmosphere by small balloons. Reports of temperature, humidity and pressure are sent almost constantly by radio code. The five-foot balloon ordinarily used expands in the decreasing atmospheric pressure as it rises, and is more than double that size at two miles or so up, when it bursts.

The instruments fall slowly to earth with the help of a parachute, and are frequently lost, but the observations are not lost because they were automatically recorded, as sent, on ground-based receivers.

Battery power is sufficient for the operation of the instruments in radiosonde equipment because the time in the air is relatively short. For the land-based stations, designed to operate some two months without attention, electric generators driven by gasoline engines are required. In addition to operating the various instruments and sending out powerful radio waves on the air to carry their reports, the engines are often needed for heating. The mechanisms used might fail to work in below-zero weather.

Special Housing

One essential in these land-based weather stations is their special housing. The eight-foot square building used must have a solid foundation to hold it in place in Arctic gales and tropical hurricanes, and also to provide an almost vibrationless setting for good instrument functioning. It must be well insulated against weather extremes, and automatically ventilated for instrument protection.

The generator set used gives both direct and alternating electric current. The first is used with the instruments, the second develops 115 volts and is primarily for the radio transmitter. An automatic clock is used to start the engine when needed. It starts the engine at the exact time when observations are to be taken and the instrument readings put

on the air, much as the electric timer on a kitchen stove turns on the heat. The weight-driven clock is re-wound electrically when the generator set is in operation. A temperature control starts the engine when extreme cold makes it necessary.

A circuit selector set in the equipment ranks next to the generator in importance. It is composed of a number of synchronous motors so wired as to insert precision resistors into the keying relay of the radio transmitter. The resistors represent the actual recording shown by the meteorological instruments. These instruments are similar to those used in any weather observatory. They include a barometer, thermometer, humidity indicator, wind vane, wind velocity indicator and a rain gage.

Radio Antennae

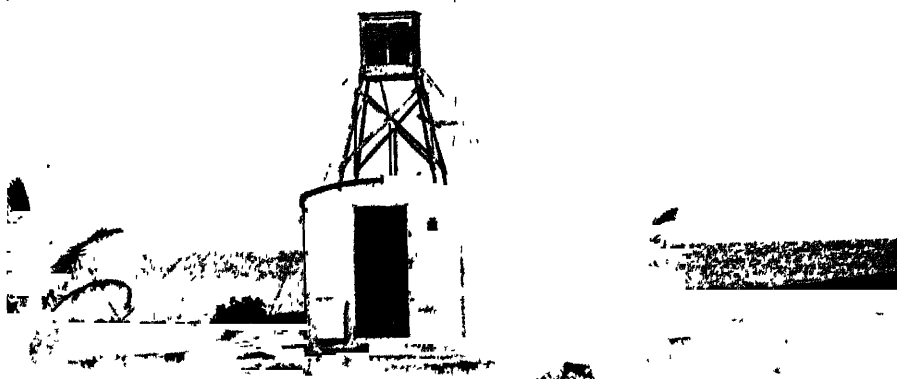
Two radio antennae stretch between two radio masts, 40 feet high and 75 feet apart. These masts must be strong to withstand all sorts of weather conditions, and positioned to provide projection in the particular direction desired. One difficult problem is securing good propagation from any particular locality in spite of terrain or other interference. Installations have to be "tailor-made" for the conditions existing at each station.

An assembly of instruments, including a vane, anemometer, and other wind equipment shown on the cover of this week's *SCIENCE NEWS LETTER*, are mounted on top of the radio mast.

The ideal set by scientists for weather reporting from the Arctic Circle is one station in every 300-mile stretch from the Aleutians to Greenland. Some would be manned, but many would be automatic. These latter will need servicing every two months and a supply of gasoline for fuel. Reaching them in some locations will be a dog-sled matter, at least until they can be reached by airplane or helicopter.

A typical station has an 80-gallon gasoline tank. Somewhat over half its content is used in a 60-day period under ordinary conditions. In cold weather, when heating is required, consumption is considerably greater. The amount consumed depends also upon the frequency of reports. For this reason, particularly hard-to-reach stations will report only at six-hour intervals.

How electrical readings are made with



AUTOMATIC WEATHER REPORTING—This shows a typical unmanned station used by the Department of the Navy. Electric generators driven by gasoline engines allow it to operate some two months without attention.

meteorological instruments is not a complicated matter. In the radiosonde, for instance, the electric hydrometer used contains a lithium chloride material that absorbs moisture. The higher the humidity, the greater the amount of electricity it transmits.

The temperature is measured by a ceramics resistor. As it gets colder, fewer electrons flow through the resistor. A diaphragm, which contracts and expands with the pressure of the surrounding air, measures atmospheric pressure. The diaphragm as it moves makes a changing electrical contact.

Weather forecasting for days ahead, as well as for 24-hour forecasting, needs constant information from many strategically-placed reporting stations. Some of these are great ocean regions where there is no land for land-based stations.

The weather over the Pacific far offshore from the continent affects the Pacific coast. Conditions over the Atlantic east of Florida must be known by pilots taking off for transoceanic flights. In these, and other areas, airborne weather-reporting stations are now in use.

Westward daily flights circling over the Pacific from California to Alaska by Department of the Air Force planes are reporting hourly the conditions encountered. Daily flights in the Bermuda-

Florida and the West Indies region are reporting Atlantic conditions.

An adapted automatic station, similar to those used on land can be used on these planes. It would probably furnish a better system than the one used now by some planes on which readings are taken by crew members, and the data transmitted to shore bases by radio.

Weather reports are international in interest. Some day, through international cooperation, thousands of automatic and other stations will cover the world—for the benefit of all.

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GENERAL SCIENCE

Small Navy Force Returns To Map Antarctic Area

➤ A SMALL Navy expedition of two ships and approximately 450 men will leave this month for the Antarctic to continue some of the projects begun by last year's large task force into the southern polar continent.

Two icebreakers, the USS Edisto and the USS Burton Island, will make the long voyage south with a party of military and civilian scientists. The Edisto will leave an East Coast port, probably Norfolk, Va., early this month, while the other icebreaker will depart from

San Pedro, Calif., about Nov. 20. The vessels will meet at Samoa early in December before proceeding to the Antarctic.

Chief job of the expedition will be to continue the mapping of the least-known continent. This will include further study of the Antarctic "oases", discovered early this year by the 1947 expedition.

The first postwar Navy venture into the Antarctic, which sailed less than a year ago, was the greatest in history. Four thousand men and a dozen ships comprised the task force which was commanded by Rear Adm. Richard H. Cruzen, now senior member of the Naval Review and Clemency Board.

Lt (jg) R. G. Thompson of the Navy's Hydrographic Office will head a group of civilian and military scientists who will conduct mapping work on the expedition.

The ships will head into the Ross Sea and visit the famous base of retired Rear Adm. Richard E. Byrd, Little America. At Little America a check-up will be made on weather and time effects on equipment left there last year.

The expedition will be in the Antarctic for that continent's summer, our winter months.

Science News Letter, November 8, 1947



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ACROSS THE TOP OF THE WORLD. A Discussion of the Arctic—M. C. Shelesnyak—Govt. Printing, 71 p., illus., paper, 20 cents. Prepared by the Office of Naval Research, this history of the explorations of the Arctic describes the problems of aviation in this region, emphasizing rescue and survival.

ANNUAL REPORT OF THE SMITHSONIAN INSTITUTION, 1946—Govt. Printing, 440 p., illus., \$2.25. With Appendix.

A S. T. M. STANDARDS ON COAL AND COKE—Am. Soc. for Testing Materials, 159 p., illus., paper, \$2.00, includes papers on sampling methods, chemical analysis, testing methods, specifications and classifications and definitions of terms.

ATMOSPHERIC POLLUTION—W. C. L. Hemmion and T. F. Hatch—Mellon Inst., 4 p., illus., paper. Free from Industrial Hygiene Foundation, Mellon Institute, Pittsburgh, Pa.

THE ATOM BOMB AND THE ARMED SERVICES—Bernard Brodie and Eilene Gallo-way—Legislative Reference Service, Library of Congress, 17 p., paper, available to libraries only. Free from Library of Congress, Washington, D. C.

BASIC BOTANY—Fred W. Emerson—Blakiston, 372 p., illus., \$4.00. For beginning college students, this text emphasizes the scientific method of problem solution.

BENJAMIN SILLMAN—Pathfinder in American Science—John F. Fulton and Elizabeth H. Thomson—Schuman, 294 p., illus., \$4.00. A biography of this famous geologist, chemist, and educator, who became "the father of American scientific education."

CALCIUM AND PHOSPHORUS IN FOODS AND NUTRITION—Henry C. Sherman—Columbia, 176 p., \$2.75. Planned essentially for teachers, nutritionists and advanced students, this book deals with quantitative distribution in the body and in foods, and considers nutritional functions.

CATALOGUE OF TYPE SPECIMENS OF MAMMAL IN CHICAGO NATURAL HISTORY MUSEUM—Colin Campbell Sanborn—Chicago Natural History Museum, Fieldiana. Zoology, Vol. 32, No. 4, 293 p., paper, \$1.00.

CHEMICAL AND TECHNICAL STENOGRAPHY—James Kanegis—Publ. by the author, 387 p., \$5.00 Shorthand adapted specifically to use in the physical sciences, with emphasis on metallurgy and chemistry.

CHEMICAL INSECT ATTRACTANTS AND REPELLENTS—Vincent G. Dethier—Blakiston, 289 p., illus., \$5.00 Up-to-date and comprehensive data on chemical, botanical, physical and physiological factors

CHEMICAL PROCESS PRINCIPLES—Part II: Thermodynamics—O. A. Hougen and K. M. Watson—Wiley, 347 p., \$5.00. Practical methods of process design and analysis with minimal experimental data are emphasized in this inclusive and advanced discussion of thermodynamic problems of process industries

THE CHEMISTRY OF ORGANIC CYANOGEN COMPOUNDS—Varkes Migrdichian—Reinhold, American Chemical Society Monograph No. 105, 460 p., \$12.00. A widely inclusive survey of the chemistry of cyanogen compounds, with little reference either to specific preparations or to historical matters.

COLCHICINE BIBLIOGRAPHY—O. J. Eigsti, with supplement by P. Dustin, Jr.—Lloydia Library, 114 p., paper, 50 cents.

CONFLICTS OF POWER IN MODERN CULTURE—Lyman Bryson, Louis Finkelstein, and R. M. MacIver, eds.—Harper, 703 p., \$6.50. A symposium of 62 approaches to the basic problems of aggression and power in western culture, and proposed methods for the integration and transformation of that culture

CORNELL CONFERENCES ON THERAPY—Vol II—Harry Gold—Macmillan, 354 p., \$3.75. Intended for those having a professional interest in medicine or pharmacy, this book contains sixteen of the Conference discussion on pharmacologic practice.

DIAGNOSIS IN DAILY PRACTICE—Benjamin V. White and Charles F. Geschickter—Lippincott, 693 p., illus., \$15.00. A comprehensive and practical basic book intended to assist physicians in general practice toward establishing diagnosis by evaluating clinical findings.

THE DISTRIBUTION OF LEUROGNATHUS: A Southern Appalachian Genus of Salamanders—Clifford H. Pope and Nelson G. Hairston—Chicago Natural History Museum, Fieldiana: Zoology, Vol. 31, No. 20, 8 p., illus., paper 10 cents.

THE FERNS OF NEW JERSEY—Mintin A. Chrysler and J. L. Edwards—Rutgers Univ. Press 201 p., illus., \$4.00.

FM SIMPLIFIED—Milton S. Kiver—Van Nostrand, 347 p., illus., \$6.00. This handbook explains FM radio clearly, describing practical applications in construction, operation, installation and servicing of all existing FM equipment.

THE FUNDAMENTAL WORK ON THEORY, APPARATUS, AS WELL AS PROCEDURES OF DISTILLATION AND RECTIFICATION—H. Stäge and G. R. Schultze—Hobart, 179

p., paper, \$6.75. Reproduced by authority of the Alien Property Custodian, this comprehensive German compilation of the literature from 1920 to 1944 will be of considerable interest to American technologists.

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HAWAIIAN AMERICANS—Edwin G. Burrows—Yale Univ. Press, 228 p., \$3.00 An anthropologist's lucidly-written account of the mingling of the four races and cultures of the Hawaiian Islands.

HENRY PHIPPS INSTITUTE FOR THE STUDY, TREATMENT AND PREVENTION OF TUBERCULOSIS 31ST REPORT: 1944-1946—Each paper separately paged, paper, available only to organizations. Free from Seventh and Lombard Sts., Philadelphia, Pa.

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HOW MUCH AND HOW MANY—Jeanne Bendick—Whittlesey House, 188 p., illus., \$2.00. For young people, this interesting and cleverly illustrated book defines terms, describes weights and measures in their many usages, historical and present

THE INDIANS OF THE AMERICAS—John Collier—Norton, 326 p., illus., \$3.75. Written by the former U. S. Commissioner of Indian Affairs, this book recounts the colorful history of the American Indians from Paleolithic times to the present, correlating the Indian records of Spain with those of the United States.

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JACK MINER AND THE BIRDS—Jack Miner—Reilly and Lee, memorial ed., 302 p., illus., \$3.50. The unique, self-revelatory record of a man who loved birds and in his own way tried to befriend them.

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MODERN CLINICAL PSYCHIATRY—Arthur P. Noyes—*Saunders*, 2nd ed., 570 p., \$5.00. Extensive revision of earlier presentation of a number of psychiatric concepts now accepted as fundamental, a chapter on psychiatric aspects of general medicine has also been added.

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MOVING WEATHER, Part I Private and Introduction to Commercial—Russell R. Spafford—*Tenn. Flight Operators Assn.*, 69 p., illus., \$2.40. Adapted to self-instruction, this book furnishes illustrated text materials and movable models to assist the student of private or commercial flying in outdoor study of weather.

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NOTHING SO STRANGE—James Hilton—*Little, Brown*, 308 p., \$2.75. The struggle for the atomic bomb is the background for this novel, with Prof. Framm a composite of Nazi scientists and Dr. Bradley a plausible young American physicist.

NUTRITION IN RELATION TO CANCER—Charles Glen King, et al.—*N. Y. Acad. of Sciences, Annals*, Vol. XLIX, Art. 1, 139 p., illus., paper \$2.00.

ORIGIN AND DEVELOPMENT OF CRATERS—T. A. Jaggar—*Geol. Soc. of Am., Memoir* 21, 508 p., illus., \$6.00. Extensive chronicling of physical processes of Hawaiian craters, covering the field of volcanic activity for the first half of the twentieth century; a section is devoted to the principles of crater evolution.

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191 p., illus., paper, \$1.50, cloth \$2.50. Written for the layman and undergraduate student, this history of Southwestern archaeology traces the development of southwestern cultures from many millennia before the opening of the Christian era through the time of the Spanish Conquest.

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THE ROYAL BOTANICAL EXPEDITION TO NEW SPAIN—Harold William Rickett—*Chronica Botanica*, Vol. 11, No. 1, 86 p., illus., paper, \$2.50. A history of Mexico's botany from 1787 to 1820, as culled from the records of the Expedición Botánica sent by Charles III in 1787.

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UNITED STATES ARMY IN WORLD WAR II—The Army Ground Forces—*The Organization of Ground Combat Troops*—Kent Roberts Greenfield, Robert R. Palmer, and Bell I. Wiley—*Gout. Printing*, 540 p., \$3.25. Issued by the Historical Division, Department of the Army, this is the first in a long series of volumes documenting World War II, and describes the mobilization and preparation for combat of the ground army.

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WEATHER HORIZONS—Frances Day Ashley, *American Meteorological Society*, 79 p., paper. A series of articles discussing various types of careers in meteorology, and the factors influencing them. Free from: 5 Joy St., Boston 8, Mass.

WHAT YOU CAN DO FOR HIGH BLOOD PRESSURE—Peter J. Steincrohn—*Double-day*, 191 p., \$2 50. Written for the layman, this book gives valuable information concerning the symptoms and treatment of high blood pressure, with suggestions for the hypertensive's adjustment to a new way of life.

WIND TUNNEL TESTING—Alan Pope—*Wiley*, 319 p., illus., \$5 00. This first thorough study in the field presents data concerning all types of wind tunnels.

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Science News Letter, November 8, 1947

PSYCHOLOGY

Mentally Ill See Less Motion in Still Pictures

➤ ORDINARILY it is the mentally ill person who sees things that are not there. But when it comes to seeing people dancing, running, or moving about in a still picture, the normal person is better.

In fact, a test based on this ability to see figures in motion on cards of varying shading and contours, can be used to distinguish between normal and abnormal individuals. Drs. Joseph Zubin, David M. Levy, and Ralph Rust, of the New York Psychiatric Institute, have reported to the American Psychological Association.

Science News Letter, November 8, 1947

THE CHEMICAL ELEMENTS

Compiled By
PHILIP S. CHEN, Ph.D.
PROFESSOR OF CHEMISTRY, ATLANTIC UNION COLLEGE

WALL CHART

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Specific heat

Boils of vaporization and fusion

Heat conductivity

Electrical conductivity

Electrical resistivity

Coefficient of thermal expansion

Coefficient of contraction, and uses

The radioactive elements

Activity series

Distribution in earth crust, in ocean, in atmosphere, and in human body

Mechanical properties of principal metals

Key showing symbols

Alchemical symbols for chemical elements

Critical constants for chemical elements

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Index to the elements

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✿ **PORTABLE PUMP**, for farm use or draining flooded cellars, has aluminum castings which make it so light that one man can easily carry it where needed. It is operated by a built-in gasoline engine with its cylinders, piston, crankcase and flywheel fan of aluminum alloy.

Science News Letter, November 8, 1947

✿ **POCKET** electrical tester consists of an insulated spirocket around which is wound six feet of test wire, with one end of the test cord terminating in a standard base plug, the other in two test prods. One of these contains a test lamp. It is for use in testing all sorts of electrical appliances.

Science News Letter, November 8, 1947

✿ **BULLET TRAP**, a safety device for gun practice, is a box-like device of metal with a removable cardboard or plywood target on its front. The steel sides slope inward toward the rear where there are two 10-gauge steel sheets. The construction is so designed that the bullets are pulverized.

Science News Letter, November 8, 1947

✿ **ELECTRIC COOLER** for bottled water, for use where piped water is not available or where spring water is used, is a 15-inch square cabinet about four and a half feet high which has an enameled top to hold the inverted bottle. The condensing compartment is easily reached through a front panel.

Science News Letter, November 8, 1947

✿ **INDUSTRIAL** microscope, for uses ranging from drilling tiny holes to as-



sembling miniature radio and radar tubes, gives the magnified image right side up, rather than inverted, thus making it easier for the operator. It can be used on a table, or bolted to a machine through a hole in its base.

Science News Letter, November 8, 1947

✿ **STRENGTH** tester, 100 pounds capacity, will handle the tensile strength of rope, cord, fibers and wire up to one-eighth inch in diameter and the compression strength of metals, rubber, fiberboard and plastics. It is a compact instrument that can be held in one hand while operated.

Science News Letter, November 8, 1947

✿ **AIR-STORAGE** tank, about 15-inches long and seven in diameter, is carried in the automobile and used to inflate a flat tire on the road. The light tank, with hose to connect to the tire valve, can be refilled like an ordinary tire at the free-air pump of a service station.

Science News Letter, November 8, 1947

✿ **RUBBER STRIPS**, to form bevels and decorative grooves on concrete surfaces, are attached to the forms instead of the conventional wood strips. They are held in position by a waterproof adhesive, but can be easily removed without chipping the mortar.

Science News Letter, November 8, 1947

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Question Box

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Photographs: Cover, Signal Corps Engineering Laboratories; p. 291, Fremont Davis; p. 292, General Electric Co.; p. 294, Dr. Thomas C. Poulter; p. 295, Dr. Edwin R. Willis; p. 299, Navy.

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SCIENCE NEWS LETTER



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Exploration of ocean depths is made possible by RCA Image Orthicon television camera.

The ocean is a "goldfish bowl" to RCA Television!

Another "first" for RCA Laboratories, undersea television cameras equipped with the sensitive RCA Image Orthicon tube were used to study effects of the atom blast at Bikini . . .

There may come a day when fishermen will be able to drop a television eye over the side to locate schools of fish and oyster beds . . . Explorers will scan marine life and look at the ocean floor . . . Undersea wrecks will be observed from the decks of ships without endangering divers.

With the new television camera, long-hidden mysteries of the ocean depths

may soon be as easy to observe as a goldfish bowl—in armchair comfort and perfect safety.

Exciting as something out of Jules Verne, this new application of television is typical of research at RCA Laboratories. Advanced scientific thinking is part of any product bearing the name RCA, or RCA Victor.

When in Radio City, New York, be sure to see the radio and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. *Radio Corporation of America, RCA Building, Radio City, New York 20.*



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RADIO CORPORATION of AMERICA

GENERAL SCIENCE

Peace Through Education

UNESCO, now meeting in Mexico City, hopes to provide the framework that will repair the war damage to schools, laboratories, museums and the minds of men.

➤ IF PEACE and plenty can be brought to the world through education and science, thought and planning, the month-long meeting of UNESCO in Mexico City may be one of the world's most important international conferences. For a year, from its Paris headquarters and through committees in various countries, UNESCO has built the framework upon which knowledge and brainpower of all the world might be put to work.

Uppermost, with the thousand conferees, is the hope that war damage to schools, laboratories, museums and the minds of men may be repaired. This is a first job.

Even more important is building for the future a peaceful world civilization. This is in the thoughts of all those now struggling with the voluminous reports and the sea of words. Is there time? Can reason and knowledge spread over the world with the necessary human under-

standing that will neutralize the march toward war?

It would be better if Soviet representatives were present to help discuss intellectual ways of neutralizing the need for atomic bomb. Soviet Russia has not yet joined UNESCO, although the door is still wide open.

UNESCO aims to make available to everyone in the world adequate education, the fruits of science and the benefits of what is called culture—art, music, literature, drama, etc.—as part of a world campaign against ignorance, disease and poverty. The experts want everyone to have a minimum education, regardless of where they live, their race, their skin color, sex or economic or social status.

Ideas and knowledge will flow to all parts of the world unhampered if UNESCO has its way. There will be more travel between countries, particularly by young people. Tariffs, quotas and other restrictions upon scientific,

educational and cultural material will be eliminated. People will be told in all corners of the world about the facts and methods of science and how they make a better world.

High on the list of things UNESCO hopes to do is to increase popular understanding of science and its social implications.

Science News Letter, November 15, 1947

MEDICINE

Army Team's Physician Tells How To Mend Fast

➤ CAPT. Herman J. Bearzy, athletic team physician at the United States Military Academy and as such the man responsible for getting Army's star players back into the game as soon as possible after any injury, tells other physicians how he does it in a report to the *Journal of the American Medical Association* (Nov. 8).

Joints, muscles and bones are the parts of the body most often injured in competitive sports, he states.

Treatment is slanted toward restoration of normal function to the injured part by stabilizing the weakened joints through increased muscle strength and tone.

The first step is to relieve the pain and swelling by cold applications. Heat is then employed to increase the circulation to the injured part and help nature with its repair work. Massage, rest and gentle manipulation of joints prevent stiffness, so that the athlete can return to his game in good condition in a few weeks.

An athlete with badly sprained ankles, feet, knees or shoulders can return to playing football in 10 to 14 days with adhesive strappings supporting his joints, but he will always need supportive bandage for all vigorous exercises.

A strained muscle or tendon while allowing for participation in sports requires certain care. The torn ligaments are repaired by scar tissue which has a poor blood supply. Therefore twice the amount of time is needed to "warm up" to prevent another rupture.

Bruises, most often occurring in thigh muscles, must be protected against repeated injury by wearing protective devices. Strenuous exercises are prescribed for dislocations. Mechanical devices such as the stationary bicycle, shoulder wheel, bar bells and chest weights are used to overdevelop the muscles after a dislocation so their extra strength will help prevent redislocation.

Science News Letter, November 15, 1947



EGGS FOR VACCINES—This shows the first step toward safeguarding the nation against influenza and other virulent diseases. The eggs are placed in the huge electric incubators for from six to 11 days, depending upon the type of vaccine desired, at the Embryo Building at Larro Research Farm, General Mills, near Detroit. *I. H. Litigow*

MEDICINE

Drug Allergies Revealed

Six out of every 100 Americans may be allergic to penicillin and streptomycin because they have had athlete's foot or ringworm of the scalp.

► SIX out of every 100 Americans will be barred from the life-saving benefits of penicillin if they get pneumonia or other serious disease because they have previously had athlete's foot, ringworm of the scalp or some other fungus infection. These same six per 100 may also be unable to take streptomycin treatment.

This unfortunate result of fungus infections, bad enough in themselves, was reported by Dr. Samuel M. Peck of Mount Sinai Hospital, New York, at a fungus disease conference at the New York Academy of Sciences. The conference is the first on the subject of medical mycology ever held in the United States.

The explanation is that the fungus infections set up an allergic state so that a patient infected with any one of the common fungi may develop an allergic skin eruption to reinfection with any other fungus capable of producing the same sensitizing, or allergy-inducing, chemical.

Many of the disease-causing fungi can also produce a substance similar to penicillin. As a result, a person who never has had penicillin may be sensitive to it. When it is given as treatment, he gets an allergic reaction that may be severe enough to require stopping the penicillin.

Penicillin comes from a mold which is one of the lower fungi, and streptomycin comes from an actinomycete which is a still lower fungus. Streptomycin as now available for treatment contains factors which show cross sensitization to penicillin and to trichophylin, the sensitizing, or allergy-inducing, chemical in ringworm and athlete's foot fungi.

Recent statistics on large groups of patients show that 30% to 50% of adults show signs of having acquired sensitization to fungi and their products, Dr. Peck reported. About 75% to 90% of the general population above the age of 12 is said to have been affected at one time or another with fungus disease. There may be even more in this state in the future because of the nation-wide epidemic of ringworm

of the scalp which attacks children under the age of 12. Thousands of such cases have been recorded and presumably the youngsters are becoming sensitized to other fungus chemicals including penicillin and streptomycin.

Saving feature of the situation is that not everyone who has a fungus infection necessarily gets a very high degree of sensitization.

The sensitization from fungus infection is suspected by some scientists of causing another kind of trouble. It may play a part in causing diseases of the tiny blood vessels near the surface of the body, in the fingers and toes, for example. Some of these diseases are excruciatingly painful and disabling and because they interfere with circulation may lead to gangrene.

Fungus infections complicate the tuberculosis problem, other speakers at the conference pointed out.

One such infection, called histoplasmosis, is now believed to cause calcified areas in the chest which show on X-ray pictures. In the past, such calcified areas were always taken as signs of healed tuberculosis. But tuberculin tests of thousands of persons showing these calcified areas revealed they had not been infected with TB. And a similar test with a chemical from the histoplasmosis fungus showed that many with calcified areas in the chest had had the fungus infection. As Dr. Amos Christie of Vanderbilt University pointed out, the studies show the need for revising present-day ideas about primary complex or first infection tuberculosis in relation to pulmonary calcification.

Science News Letter, November 15, 1947

MEDICINE

Family Study Launched To Observe Disease Impact

► JUNIOR'S mumps are going to become more significant as a result of a unique research program which will involve between 50 and 100 Cleveland families.

The study is launched in the hope that further knowledge will be gained about the spread of common infections, the

behavior of disease in the family group, and basis for the different responses of various members of the family to disease in early life which is believed to influence future health and development.

The program will be conducted by the Elisabeth Severance Prentiss Department of Preventive Medicine in the Western Reserve School of Medicine under the direction of Dr. John H. Dingle, its head. It is to be supported by funds of the department, and grants from the Brush Foundation, the Cleveland Foundation, the Commission on Acute Respiratory Disease, Army Epidemiological Board, Department of the Army, and possibly from the S. P. Fenn Trust

Science News Letter, November 15, 1947

SCIENCE NEWS LETTER

Vol. 52 NOVEMBER 15, 1947 No. 20

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year, two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

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PHYSIOLOGY-CHEMISTRY

Warn of X-Ray Dangers

Doctors point out that permanent skin damage leading to cancer and death may follow use of X-rays or atom bomb by-products to remove hair from face and body.

➤ PERMANENT skin damage leading to cancer and death may follow use of X-rays or atom bomb by-product chemicals used to remove excessive hair from face and body, Dr. Anthony C. Cipollaro of New York and Dr. Marcus B. Einhorn of Albany, N. Y., warn. (*Journal, American Medical Association*, Oct. 11.) Their report is authorized by the A.M.A. council on physical medicine for the guidance of doctors.

More than 50 cases of cancer developing five, six and as long as 20 years after treatment with a so-called safe X-ray system for removing hair are briefly recorded in their report. Thousands more probably occurred.

"A new monster is now lurking around the corner," the two physicians state. "It is hoped that the danger can be forestalled and girls and young women can be saved from the agonizing pain suffered by their sisters two decades ago."

"Even boys and young men may be

subjected to the same danger because a patent has been issued for the 'X-Ray Razor.'"

The immediate results of X-ray treatment for removing excessive hair are always good, they state. It takes months or years for the skin trouble to develop and still longer for ulcers, cancer and death to occur.

Present interest in radioactive chemicals, called radioisotopes, from the atom bomb pile might, the physicians think, lead some one to the idea of using a solution or other preparation of such a chemical for removal of excessive hair. On this particular atomic age danger they state:

"There is no question whatever in the minds of physicians that radioactive isotopes can cause permanent defluvium (sudden loss of the hair) but at the same time can so damage the skin that all the changes associated with a radio-dermatitis (skin trouble), including the malignant changes, will be manifested."

Science News Letter, November 15, 1947

MEDICINE

New Vaccine To Be Tested

➤ WIDE-SCALE tests of a new vaccine that may stop a disease of both man and cattle and at the same time increase the quantity of milk for human consumption are getting underway in Michigan.

The vaccine, developed by Dr. I. Forest Huddleson, bacteriologist of Michigan State College, is for undulant fever. Known also as Malta fever and brucellosis, this disease attacks cows, pigs and goats. Humans get it from infected animals and particularly from unpasteurized milk from infected cows. In humans, it is a tedious, long, weakening disease with frequent relapses. It is occasionally fatal.

Some 220,000,000 pounds of milk are lost each year in Michigan alone because of the disease in dairy cows, it is estimated.

No harmful effects on breeding or milk production were caused by the vaccine in preliminary tests on cows. Almost half, 43%, of animals suspected

of harboring undulant fever germs, were free of infection after being vaccinated.

The great value of the vaccine is expected to come through the possibility of preventing the spread of the disease in animals of recently infected herds. This will make it possible to eliminate infected animals, immunize the remainder and have not only a disease free herd but one which is immune to further attack from the disease.

The Michigan State College laboratory is prepared to produce the vaccine in quantities to treat 2,000 cattle daily. Distribution within the state through registered veterinarians has been authorized by the Michigan Commission of Agriculture. None will be available outside Michigan until Dr. Huddleson and associates learn more about the vaccine's effectiveness, work out distribution problems and apply for a federal license.

Science News Letter, November 15, 1947



NEW SPECIES—This native American yellow lily discovered in the South has been given the botanical name, *Lilium iridollae*, meaning "pot-o'-the-rainbow."

BOTANY

New Native American Lily Discovered in South

➤ A NEW species of native American lily, of rare golden beauty and delicate fragrance, has been discovered in extreme southern Alabama and the western tip of the Florida panhandle by Mrs. Mary G. Henry of Gladwyne, Pa. The recurved segments of its nodding flowers are described as warm buff-yellow to golden yellow in color, conspicuously spotted with brown.

Mrs. Henry, a great lover of lilies, had for years hoped that her searchings afield might some day be rewarded with a really new species, like the fabled pot of gold at the end of the rainbow. When her wish came true, she decided to give the flower a botanical name meaning "pot-o'-the-rainbow". So the species has been formally christened *Lilium iridollae*.

Although native to the South, the new lily seems to be at least fairly hardy in the North. Its discoverer has grown new plants from seed, and both the bulbs and the winter rosettes have survived the cold of Pennsylvania winters.

Science News Letter, November 15, 1947

Plastic beads, as well as glass beads, are now used in making artificial pearls; the plastic type is said to hold the natural or synthetic pearl essence used as a coating better than the glass bead.

PUBLIC HEALTH

WHO is Free of Disputes

Its meetings are peaceful with no one voting or vetoing. But it has received only 17 of its necessary 26 ratifications by United Nations members.

➤ THE United Nations has one organization nobody fights about. It is the only one on which everybody agrees. Its meetings are peaceful, with everyone happy, no one voting and no one vetoing.

This unique agency is the World Health Organization. The only fly in the ointment is that WHO's constitution has not yet received its necessary 26 ratifications by United Nations members.

Its efficiency in meeting the threat of a worldwide spread of cholera from Egypt is an example of one important function this organization has. Equally if not more important, in the view of WHO leaders and other health authorities, is its potential ability to bring not only health but peace to the world.

The United Nations may be able to agree on some method of removing such immediate threats to peace as the atom bomb and germ warfare. But for lasting peace, health authorities and even some political authorities agree, the peoples of the world must have sound minds in sound bodies.

Sick minds inspired most of the horrors of the last war if not the war itself. The man in the street knows this as well as the psychologist in his laboratory, the psychiatrist in his office or clinic. Preventing sick minds in the world in the future is one of WHO's aims. Significant of this is the fact that the executive secretary of WHO's interim

commission, Dr. Brock Chisholm, is a psychiatrist. Significant also are the following principles laid down by WHO's founders at the International Health Conference:

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

"The health of all peoples is fundamental to the attainment of peace and security. . . .

"Healthy development of the child is of basic importance; the ability to live harmoniously in a changing total environment is essential to such development.

"The extension to all peoples of the benefits of medical, psychological and related knowledge is essential to the fullest attainment of health."

Readiness to achieve these aims through the World Health Organization has been shown by the following 17 United Nations members who have ratified WHO's constitution: Canada, China, Ethiopia, Haiti, Iran, Iraq, Liberia, the Netherlands, New Zealand, Norway, Saudi Arabia, Siam, Sweden, Syria, Turkey, the United Kingdom, and the Union of South Africa. Expected to ratify before the end of this year or early in 1948 are: Yugoslavia, Brazil, France, Denmark, the United States and India.

Science News Letter, November 15, 1947



TUSsock MARSH—In this typical Alaskan "Mosquito Heaven", endless stretches of shallow, quiet water, ideal for breeding purposes, are almost completely concealed by tiny, high-standing islets bearing grasses, sedges and other vegetation.

extent the movement of blood not yet sludged.

Sludged blood has been seen in patients with conditions ranging from hysteria, burns and common colds to cancer, scarlet fever, infantile paralysis and arthritis, or rheumatism.

There are many different kinds of blood sludges, the scientists report. How a particular sludge can damage the body depends on the chemical makeup of the material holding the blood cells together in wads and on the size, shape and other physical characteristics of the particular sludge.

Many sludges could be expected to do at least small amounts of permanent damage to the body. How all the damages by sludges add up as parts of the aging process, and how fast they can add up over short periods of years need to be studied.

Dr. Knisely's studies of patients, healthy persons and laboratory animals from which discovery of sludged blood was made have been going on over 16 years. Many of them have been made by observing the small blood vessels in the eyelids and covering of the eyeball of living animals and patients. Oblique illumination and binocular dissecting microscopes were used.

Science News Letter, November 15, 1947

MEDICINE

Clue to Aging Is Found

Clumping of cells in the blood vessels may cause damage which contributes to growing old, mental illness and many other diseases.

➤ SLUDGED blood in the arteries and veins holds the key to solution of problems of aging, mental illness and many other diseases, it appears from a report by Drs. Melvin H. Knisely, Edward H. Bloch, Theodore S. Eliot and Louise Warner, of the Universities of Chicago, Copenhagen and Tennessee, to the journal, *Science*, (Nov. 7).

In normal, healthy young persons the blood cells move along the veins and arteries, even very tiny blood vessels, without sticking to each other or to the walls of the blood vessels. But in a wide variety of sicknesses and in shock following accidents, the cells clump and stick together, forming a sludge which moves slowly if at all and which blocks to some

BIOLOGY

Mosquitoes Tracked Down

Botanists work with entomologists in finding mosquito breeding grounds in Alaska and developing field methods for identifying them by airplane.

➤ BOTANISTS are playing a vital role in the campaign against the worst summer enemies our troops in Alaska have to face—mosquitoes. Entomologists spot the “wigglers” that are their infants, as they swim in still pools of water. The job of the botanists is to learn what types of vegetation grow around the mosquito nurseries, often concealing them altogether, and to develop practical field methods whereby these plant associations may be identified from a distance with a pair of binoculars, or even from high-altitude airplane photographs.

At a meeting of the Biological Society of Washington, Rev. Hugh O'Neill, professor of botany at the Catholic University of America, told of pioneer studies along this line which he and two colleagues, Rev. Arthème Dutilly, director of the Arctic Institute in Washington, and M. l'Abbe Ernest LePage of the

school of agriculture at Rimouski, Quebec, conducted last summer at the invitation of the Quartermaster General. The work was done as part of an expedition in which eight government agencies, both civil and military, cooperated under the direction of Dr. Bernard V. Travis of the Bureau of Entomology and Plant Quarantine, U.S. Department of Agriculture.

Number one mosquito breeding ground, the three botanists found, is what Father O'Neill described as “tussock marsh”. This is a swampy terrain dotted with innumerable little heaps of debris which stand high enough above the water level to support a few dry-land plants. Between these and the true swamp plants, such as sedges and willows, the watery nature of the terrain is well camouflaged—from man, but not from mosquitoes. There are also more

open marshes, in which pools and ponds are clearly visible; these seem to constitute an earlier stage in the vegetational development.

While these marshes afford breeding-space for billions of mosquitoes, the stinging pests do not overlook even small bays. They were found breeding in water-filled cavities left by the roots of over-turned trees, and even in puddles formed by the treads of caterpillar tractors.

The Alaskan mosquito, Father O'Neill said, “has the table manners of a Bengal tiger,” and bores right in instantly whenever the slightest area of skin is exposed. However, the new Army insect repellent, developed during the war, is very effective in driving them off, and DDT fog knocks them out promptly. The mosquito's fellow-pirate, the black fly or no-see-um, proved less susceptible to both repellent and DDT. Something more drastic will have to be found for combating black fly.

Science News Letter, November 15, 1947

BIOLOGY

Two Naturalists To Gather Data on Antarctic Life

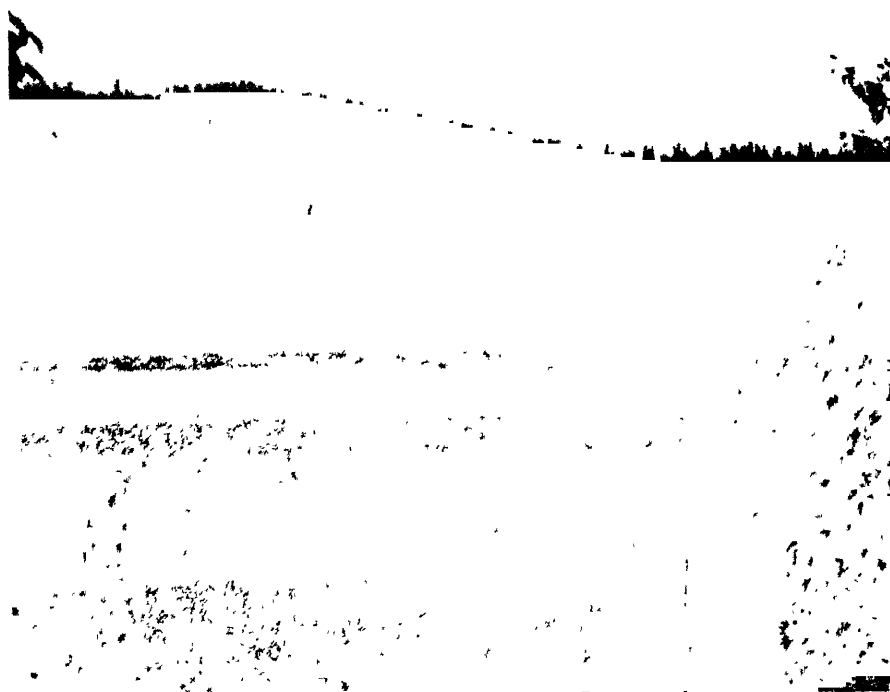
➤ MORE penguins for the National Zoological Park and information for the National Museum about life in the strange “oases” in Antarctica's icy desert are the objectives of two young naturalists who will accompany the Navy's new expedition to the world's southernmost waters.

The still-unknown life forms of the mysterious ice-free areas seen from the air by members of the recent Byrd expedition will be studied on the ground by David C. Nutt. He will also make collections of marine life along the shores of Antarctica and by dredging on the bottom under the ice shelf.

Mr. Nutt, a Dartmouth man who was a Navy officer during the war, has made himself a specialist in polar natural history. He has devised some new things in the way of comfortable clothing for cold regions, which he hopes to demonstrate on the present voyage.

Malcolm Davis, keeper of the bird house at the National Zoological Park, brought back a big flock of penguins when he returned from his previous Antarctic trip with the first Byrd Expedition, and has been a collector of birds and animals in the tropics as well. He is particularly anxious to secure Emperor, Adelie and Gentoo penguins on this expedition, and if possible some Antarctic seals as well.

Science News Letter, November 15, 1947



DECEPTIVE BEAUTY—This little lake, with a mountain in the background and attractive surroundings of plant life, may be a plague-spot for mosquitoes. They do not breed in the open water, but in the marshy areas that are concealed by parts of the surrounding vegetation.

ORDNANCE

Telescope on Gun Mount Tracks Long-Range Rockets

See Front Cover

➤ ASTRONOMERS will recognize the apparatus pictured on this week's cover of the *SCIENCE NEWS LETTER* as a medium-sized reflecting telescope, but the mount will seem strange. To artillerymen the mount will look all right, but what's this on it in place of its usual 90-millimeter anti-aircraft cannon? The device is one of the strangest pieces of ordnance ever built: a 16-inch astronomical telescope on a gun mount, with a 35-millimeter motion picture camera instead of the usual still-photograph plate. It is to be used at the White Sands Proving Ground to track the flight of V-2's and other long-range rockets, from a vantage-point on top of an 8,000-foot mountain 35 miles from the launching point. At present it is still being tested by scientists of the Ballistics Research Laboratories at the Aberdeen Proving Ground, Md.

Science News Letter, November 15, 1947

MEDICINE

Large Doses of Aspirin Cause Poisoning in Babies

➤ A WARNING that giving aspirin to babies may be dangerous appears in a report by Dr. Murray H. Bass of New York to the *Journal of the Mount Sinai Hospital* (Sept-Oct.). Dr. Bass reported three cases of aspirin poisoning in babies under one year old. One of them died of the poisoning. While Dr. Bass' warning in the medical journal is addressed to physicians, mothers probably also need some warning of this danger.

A good many mothers are inclined to do their own doctoring of the babies or young children when they get colds or minor ailments. If they do call a doctor, they may not pay enough attention to the size of the dose of medicine he orders. Or, if the baby does not seem to get better as fast as mother thinks he should, and the medicine ordered was anything so familiar as aspirin, she may increase the dose without asking the doctor.

The cases of aspirin poisoning Dr. Bass reports were all cases in which the baby was given too big doses of aspirin. They were all cases in which the dose was prescribed by the physician. The use of aspirin has become so common that physicians, Dr. Bass says, "are apt to forget not only that certain individuals may

have an idiosyncrasy for the drug, but that the dosage, even in the average individual, must be definitely controlled."

The baby who died had been given more than 10 times the correct amount of aspirin. The correct dosage, for babies, according to Dr. Bass, is about one grain per year of age every four to six hours. The tablets you buy in the drug store each contains five grains.

Deep and very rapid breathing is the commonest symptom of aspirin poisoning. Fever may be a symptom and this may lead to confusion in the diagnosis. If the baby had a cold, and his temperature went up, it might be thought he was getting pneumonia. Other symptoms are nausea and vomiting, ringing in the ears, irritability, dizziness, delirium, restlessness, convulsions and coma, or unconsciousness. The victim may turn blue, circulation may fail and he may become dehydrated.

Science News Letter, November 15, 1947

MEDICINE-NUTRITION

Fish Tapeworms Destroyed Only by Thorough Cooking

➤ FISH must be thoroughly cooked before eating if a kind of worm, called broad fish tapeworm, is to be prevented from invading the intestinal tract. It isn't even necessary to eat fish to get the tapeworm into the system, merely tasting it is enough, it appears from some cases just reported by Drs. David J. Sandweiss and Marcus H. Sugarman of Detroit in the *Journal of the Michigan State Medical Association*, (Oct.). The 12 women just tasted the soup or bits of fish, to see if the seasoning was right, and spit it out, not even swallowing it. But this was enough, the doctors point out, to get some of the tapeworm larvae into their mouths which they probably later swallowed with the saliva. After the larvae get into the stomach and intestinal tract they develop into adult tapeworms.

The Michigan doctors list pike, including pickerell, burbot and trout as the kinds of fish that have tapeworm larvae in them. Some authorities also suspect salmon. Fish that is properly heated, frozen, smoked or processed during commercial preparation is not dangerous because these processes, properly done, kill the tapeworm larvae. Cooking the fish at a temperature of at least 135 to 140 degrees Fahrenheit for about half an hour is advised by the Michigan doctors for killing the tapeworm larvae in fresh fish.

Science News Letter, November 15, 1947

IN SCIENCE

GENERAL SCIENCE

Establish Science Mission In U. S. Embassy in London

➤ EXCHANGE of scientific information between the U. S. and Great Britain will be facilitated by a new Mission on Science Technology being established in the United States Embassy in London.

A small group of American engineers and scientists are being assigned to the new staff. Chief functions of the mission will be giving the British information about work in this country and gathering information on British work for distribution in the U. S.

Prof. Earl A. Evans, Jr., chairman of the department of biochemistry at the University of Chicago, will serve as first head of the U. S. mission, but personnel will be assigned for short-term periods on a rotating basis.

Fields to be covered by the new mission include organic chemistry, biochemistry, physics, engineering, biology and agronomy.

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GENERAL SCIENCE

Research Council Offers Fellowships in Science

➤ FELLOWSHIPS for research and advanced study in the natural sciences for the academic year (1948-49) are being administered by boards set up by the National Research Council Funds for the grants come from various sources.

Postdoctoral fellowships for advanced study are being financed by grants from the Rockefeller Foundation. This program has been under way for 28 years and assisted many of today's leading scientists. Fields of study for the \$2,500-per-annum fellowships include the physical and mathematical sciences, geology and geography, biological and agricultural sciences, anthropology and psychology.

Annual stipends of \$2,500 to \$5,000 are available for study in chemical or biological sciences under fellowships supported by Merck and Company. Fellowships in electronics with stipends ranging from \$1,600 to \$2,100 per annum are supported by the Radio Corporation of America in another program.

Science News Letter, November 15, 1947

THE FIELDS

GENERAL SCIENCE

Industry and Scientists Plan High School Programs

➤ SCIENCE is stepping out of the textbook and coming alive for high school boys and girls of Rochester, N. Y., in a unique science program. Local industry and science are cooperating in a monthly series of "Excursions in Science," conducted by Rochester scientists.

First "excursion" was a program on optical science given in cooperation with Bausch and Lomb Optical Company. Next month, the youthful scientists will learn about new electron microscope techniques from scientists of the Eastman Kodak Company.

Other organizations cooperating in the high school science project include local schools, Science Clubs of America, the American Chemical Society, Engineering Society, Optical Society of America, Photographic Society of America, Burroughs-Audubon Nature Club, the Rochester Academy of Science, the Chamber of Commerce and Junior Chamber of Commerce, Rochester Park Bureau and the University of Rochester. Dr. Robert L. Roudabush of Ward's Natural Science Establishment is chairman of the committee of scientists, industrialists and educators planning the program.

Science News Letter, November 15, 1947

PHYSIOLOGY-GENETICS

Footstrain Traced to Evolutionary Deformity

➤ A HIDDEN form of a common deformity of the foot which can be traced back to man's primate ancestors is often the cause of footstrain in women, reports Dr. Frances Baker, of the University of California Medical School.

The common deformity is known to doctors as metatarsus primus varus, in which the position of the bones of the instep causes an obvious inturning of the big toe. Often this is accompanied by metatarsus varus, which is an inturning of the whole forefoot.

However, Dr. Baker time and again found footstrain in women who did not have an obvious case of an inturning big toe. Looking for the cause, largely with the help of X-rays, she found that

the deformity of the bones of the instep can occur without the tell-tale inturning big toe.

Women who have either of these deformities find it difficult to wear high heels with comfort. High heels put a general strain on the whole posture, cause foot strain, calluses, bunions, and other pedal ailments.

If the secondary changes have not become marked, Dr. Baker states, the situation can be remedied when such women wear broad, flat shoes such as wedgies and sandals. The barefoot effect this gives enables the foot to go where it likes.

Dr. Baker explains the deformity as being a slight failure of evolution in some families. The inturning of the big toes was accentuated in man's primate ancestors. When man began standing upright his foot began adjusting to this position; thus the modern "normal foot" has no inturning of the big toe.

Men, of course, are subject to the same deformity, but the complaints are less because men generally wear broad, flat shoes. High heels, in themselves, Dr. Baker adds, will not necessarily cause foot strain.

The deformity can be corrected in the growing foot of a young baby, the physician states.

Of 207 female patients, Dr. Baker found 75% of foot strain was caused by one of the two conditions.

Science News Letter, November 15, 1947

WILDLIFE

Five Golden Eagles Kill One Antelope with Talons

➤ EAGLES are able to kill animals as large as antelope, Robert W. Lehti of the Colorado Game and Fish Commission reported in the *Journal of Wildlife Management* (Oct.). Although he did not see the actual kill made, he recently surprised five golden eagles about to begin their feast on the carcass of a doe antelope, so freshly dead that it was still warm, and gave off steam when he made an opening into its body cavity.

The dead animal's back showed marks as if it had been peppered with buckshot; these were talon wounds. Its tracks in blood-sprinkled snow showed that it had raced for half a mile after the first terrifying attack. Mr. Lehti calculates from this that it took the eagles one and one-half minutes to kill their quarry. Absence of death-struggle traces in the snow indicated that death had come instantly, probably when a talon penetrated the spinal cord.

Science News Letter, November 15, 1947

GENERAL SCIENCE

Scientific Film Makers Form New Organization

➤ THE world's movie producers who make films about such glamorless subjects as bacteria and the inner workings of the human body have formed a new international organization.

Films which you will not find showing at your neighborhood theater but which drew attention from the makers of scientific movies at an international meeting in Paris included a Swiss film on the operation of the electron microscope, a South African movie on bacteria and an American color film showing the growth of a lung tumor inside a living patient.

Constitution for an International Scientific Film Association was adopted at the meeting by movie makers from 20 countries. The Association is planned as an international clearing house for scientific films produced in different countries.

Science News Letter, November 15, 1947

ELECTRONICS—PHOTOGRAPHY

Math Data Can Be Kept Permanently by New Device

➤ A NEW device dubbed a "photographic memory" was revealed by the Eastman Kodak Company. It is for use in making permanent records of all figures passing at high speed through a giant electronic calculating machine being constructed by the Massachusetts Institute of Technology for the U. S. Navy.

Mathematical data, fed into the calculating machine at perhaps a thousand numbers of 12 digits each per second, are recorded on a photographic motion picture film by means of a complex photographic, electronic and optical arrangement. Records are made in tiny square spots. After the film has been developed, the information can be fed back into the calculator for further computations.

The data spots representing the digits appear first on the face of a cathode tube that resembles the screen of a television receiver. The camera makes a record of these spots by means of a moving electronic beam within the tube. In feeding the information back from the film to the computer, the data spots are projected onto photoelectric tubes. These tubes in turn, supply electrical signals, corresponding to the numbers recorded, to the calculator.

Science News Letter, November 15, 1947

ENGINEERING

Conserving Winter Fuel

The old home furnace will be in use for many more years despite the new type heating systems, therefore full heat value should be extracted from the fuel.

By A. C. MONAHAN

► THE old home furnace will continue in use for many years in spite of new heating systems developed and new and better smokeless furnaces which will deliver more heat from the fuel used than older types.

Some day the sun alone may heat your house, or perhaps you will gather your heat bit by bit from the little contained in the cold earth a few feet below frost-line. Both schemes are successful, but it will be years before they replace the local fuel-burning furnace, whether coal, oil, gas or wood.

The domestic fire belongs to an age of abundant coal, cheap labor and carelessness about social amenities, a British scientist recently said. His plea was for turning fuels into heat energy in central plants, where modern equipment is used and scientific firing can be carried out, and delivering the heat to homes in the form of steam, hot water, gas or electricity.

New Type Heating Systems

It is a dream of the future, but a practical dream already in operation in many places. Already in the United States and elsewhere a few homes are heated by the so-called solar energy of the sun. Also a limited number of homes are heated, on the refrigerator-in-reverse principle, by gathering up small amounts of heat from the cold earth below where it freezes, or from water in deep wells, or even from the cold outside air. The majority of home-owners, however, will still be shoveling coal this winter.

America has plenty of coal for centuries, and enough other fuels for many years, but their costs are rapidly mounting. Every item entering into the cost of mining and handling coal now costs more than formerly. Also, the supply of this fuel for domestic uses is not too great and probably will not be while great quantities are being shipped to help rebuild Europe's economy. The same situation is true of other fuels.

The answer in America is not a lack of sufficient heat in homes to insure comfort, but it is in getting the full

heating value of the fuel used. It is a matter that rests with the individual house user. It means not only getting the most heat out of the fuel, but also preventing heat losses in the furnace itself or from the rooms of the building.

The way that most home furnaces are operated there are several heat losses. In ashes removed from them there is often much unconsumed material, because of improper firing methods. Much possible heat escapes up the chimney from the furnace either in the form of hot gases whose heat was not picked up by the furnace flues in which water or air is circulated, or of combustible gases not burned because of insufficient air to cause complete combustion.

Art to Proper Firing

As a rule the furnace is not to blame. The fireman is. There is an art and a science to proper firing. Some learn it by a trial and error method. A better plan is for the fireman to read instructions, copies of which can be obtained free from such organizations as the U. S. Bureau of Mines, the Department of Agriculture, state colleges of agriculture and engineering, or national associations of fuel producers.

Soot and hard carbon deposits on the flues inside furnaces, being good insulation, prevent the passage of heat to the

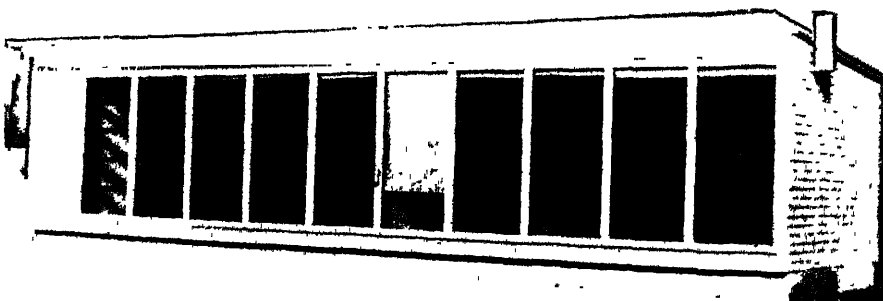
water or air used to circulate the heat to the house. They can cut the efficiency of heating as much as 30%. Any householder can keep flues clean. It means only a few hours work distributed throughout the season, using the wire brush furnished with a furnace for this particular job.

Factors in Heat Loss

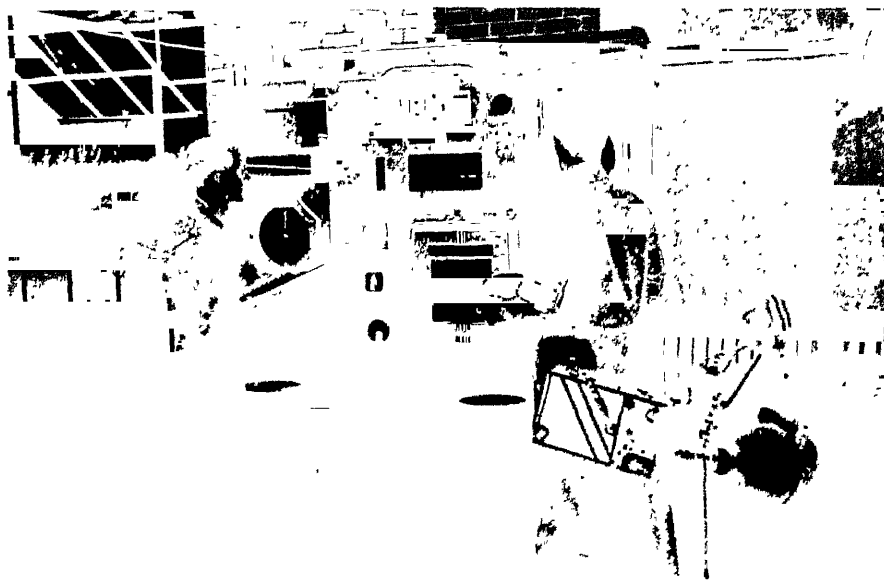
Heat losses from a room are due to poor insulation, coupled with air exchange through visible or invisible cracks and crevices. The cracks and crevices are easily closed, with rags if necessary, but better with one of the special plastic putty-like materials now available for the purpose. They occur around window and door frames, under eaves and between the ends of floor joists.

Double sash on all windows, and special storm doors, can save up to 30% of the heat ordinarily wasted from rooms. The inside of a window pane feels cold to the touch when only a single sash is used. With the double sash it is about the temperature of the room. Insulation within walls and floors also saves much heat.

Heating homes by electricity from central power stations has much to commend it but is costly at the ordinary price of the electrical energy. Heating by gas is clean, relatively inexpensive where gas rates are low, and is generally satisfactory. At present there is much interest in getting heat from the cold earth and from the hot sun. Both



SOLAR HEATING—Experiments are conducted inside this structure in separated compartments where various methods of storing the sun's heat are tested at the Massachusetts Institute of Technology



SMOKELESS FURNACE—Scientists of the University of Illinois are checking its efficiency with technical laboratory instruments. With the same amount of coal it gives an estimated 50% more heat than a standard furnace.

are promising. One problem in using solar energy is the storage of the heat. This may soon be solved.

Solar Heating Experiments

A number of American technical colleges and universities are experimenting with solar heating. Among these are the Massachusetts Institute of Technology, Illinois Institute of Technology, Purdue University and the University of Colorado. All have experimental houses, and all have succeeded with satisfactory heating in winter periods of sunshiny weather. None of them, however, have solved the problem for economical storage of daytime heat for night and stormy days. None have yet developed an inexpensive installation making the cost of all-season heating less than by the use of coal. The future, however, is promising.

One principle employed in some of these experimental structures is that used in greenhouses. A glass roof covers the regular roofing with an air space between through which air can circulate. Within this space, in the Colorado experiment, glass plates one-third blackened are laid like shingles. The black absorbs the heat, which is then passed to the circulating air and through the house-heating air ducts.

In one MIT house, a blackened copper sheet under three air-spaced glass plates

covered much of the building roof. Copper tubes, soldered to the copper plates, circulated water to a giant storage tank in the basement.

Another type of building has an all-glass wall on its sunny side. Double sash is used. Cement floors within absorb much of the heat and hold it for night use. Over the windows of these houses are projecting roofs that cut out the direct rays of the sun during the summer when the sun is high, and admit them during the winter months when the sun is low.

The focus on the solar heating problem at the Massachusetts Institute of Technology is directed toward economical storage of the heat collected. Water has been the most widely used storage material, but iron, concrete, marble and other materials have been successfully employed. Now, Dr. Maria Telkes of the MIT staff has found something that seems superior.

It is a chemical stored in sealed tanks which is a solid at ordinary temperatures but becomes a liquid at high summer weather. It takes a lot of heat to convert it from a solid to a liquid. This is what was once called latent heat but now known as the heat-of-fusion. It changes the physical condition but does not change the temperature.

One chemical found suitable for this purpose is Glauber's salt, a form of so-

dium sulfate. Its melting point is about 90 degrees Fahrenheit. When its stored heat is needed, air is circulated around the containers. The chemical begins to solidify, at the same time giving up its heat-of-fusion to the air.

The heat accumulation and depletion may be repeated indefinitely because the chemical is within a sealed can and never has to be replaced. The chemical compound can store at least seven times more heat than an equal volume of water. The tanks to hold it cost about the same as tanks for water.

Science News Letter, November 15, 1947

GENERAL SCIENCE

Finnish Institution Needs U. S. Scientific Books

➤ AN appeal for scientific and technical books and periodicals to rebuild the bomb-destroyed library of a Finnish institution has been made by Arthur E. Morgan, former president of Antioch College, Yellow Springs, Ohio, who recently returned from a trip to Finland.

Mr. Morgan reported that loss of its technical laboratory is handicapping recovery of Finland's technical institute, Teknillinen Korkeakoulu. Dr. Martti Levon, director of the institute, told Mr. Morgan that scientific and technical publications from the U. S. were needed to replace those lost in the war.

Gifts for the institute can be shipped to the Legation of Finland in Washington, D. C., for further shipment abroad, Mr. Morgan suggested.

Science News Letter, November 15, 1947

Zirconium and titanium may some day be used for tableware and jewelry; both of these so-called *rare metals* take a high polish and will not tarnish.

YOUR HAIR AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as:

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Do You Know?

PUBLIC HEALTH

Diseases from Animals

Producers of *turkey eggs* for hatching have found that artificial light in the turkey houses during the late evenings and early mornings starting the first of February results in eggs a month earlier than otherwise.

One motion picture theater, at least, has *paintings* on its walls done in fluorescent water colors; their glow does not interfere with the visibility of the motion picture on the screen but does provide aisle lighting.

Tough kraft *paper* into which 2% of melamine resin has been introduced keeps about 40% of its bursting strength when water-soaked instead of the near-zero strength without the chemical.

The only area in the United States where *flax* is grown extensively primarily for its fiber is in the Northwest; the large quantities grown in other states are primarily for the seed and oil.

THE PERFECT GIFT

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Man is victim to two more diseases transmitted by animals. Dogs may infect man with food poisoning and elephant's tusks may transmit anthrax germs.

➤ ADD to the list of diseases man may get from animals: 1. food poisoning and intestinal upsets, from dogs; 2. anthrax, from elephant tusks. Reports on both were presented at the meeting of the American Public Health Association in Atlantic City.

An employee of a piano-key industry died of anthrax which was not suspected till after his death, Drs. Roy M. Seideman and Kenneth M. Wheeler, of the Connecticut State Department of Health, reported.

The victim's job involved the sawing of elephant tusks, from which piano keys were to be made. The tusks came from East and West Africa. Anthrax germs were found in washings of tusk scraps.

This is the first case of human anthrax infection traced to elephants or their tusks, so far as the scientists could find from searching scientific literature for reports of others and from inquiry of the U. S. Public Health Service.

Workers and plant management in industries using raw ivory or elephant tusks, they warn, should be alert to the danger of anthrax. Skin sores and infections should get prompt medical attention and sanitary precautions should be observed. These are the only measures for controlling the danger until some method can be developed for sterilizing raw ivory without altering its physical quality.

The ivory may get the anthrax germs because the elephant had the disease, or during transport, either by native handling or by shipment with other animal products carrying the germs.

The danger of man getting food poisoning from his dogs was reported by Dr. Arthur H. Wolff, U. S. Public Health Service veterinarian, and Norman D. Henderson and Miss Grace L. McCallum of the Michigan Department of Health.

Examination of the intestinal wastes of 100 dogs showed that 18 of them were excreting 16 different types of Salmonella, germs which may cause poisoning in man.

Three outbreaks of food poisoning due to Salmonella germs, in which dogs

were incriminated as the source of the infection in humans, have been reported by other scientists. The Michigan group started their investigations as a result of these reports, to learn to what extent dogs may carry these food poisoning germs.

The studies showed that dogs carry these germs much oftener than has been supposed, and that the germs may have some association with distemper or intestinal inflammation in dogs or both. Further studies are under way to determine the exact significance of the findings to the health of both dogs and man.

Dog Vaccination Effective

Clear-cut evidence of the fact that vaccinating dogs against rabies controls this deadly disease was reported by Drs. Robert F. Korns and A. Zeissig of the New York State Health Department.

Rabies in animals in upstate New York increased nearly ten-fold during the period 1944-1947. From a level of approximately 100 cases per year during the previous 10-year period, it rose to 313 cases in 1944, 662 in 1945 and reached a peak of 1,175 in 1946. An unusual feature was the fact that wild foxes got the disease during this animal epidemic. The foxes in turn gave it to cattle. In 1946 there were 308 reported cases of rabies in foxes and 440 in cattle.

Countywide dog vaccination in 2-counties during the past two years, with revaccination in 12 counties, stopped the epidemic among dogs. While there were 300 rabid dogs in the upstate area during the first nine months of 1946, there were only 40 for the same period of 1947 although there were 218 rabid foxes and 173 rabid cattle during the same period.

In 10 central New York counties, the disease has almost disappeared in the dogs, though cattle and fox rabies continues. All of these 10 counties have vaccinated over 70% of their enumerated dogs. The rabies-attack rate in vaccinated dogs is now only one-eighteenth that in non-vaccinated dogs.

Science News Letter, November 15, 1947

ENTOMOLOGY-PUBLIC HEALTH

DDT War on African Flies

Vast new areas may be opened for living and food growing if the new insecticide can conquer the responsible agent of the dread African sleeping sickness.

► PILOT plant experiments that may bring more food and more living space for the hungry, fast-growing population of the world are attracting the interest of scientists at the U. S. Department of Agriculture.

The experiments are testing DDT as a conqueror of the tsetse fly and the dreaded disease, African sleeping sickness, or trypanosomiasis. If successful, they may open for food production and settlement vast, now uninhabitable areas of Africa.

Tsetse flies spread the germs of this wasting disease that dulls the mind and slows physical activity, causes protracted drowsiness and, if not treated, kills. It is an entirely different ailment from the virus-caused disease we call sleeping sickness in this country and which has the medical name, encephalitis.

The germs of the African sleeping sickness are blood parasites that feed on the blood of wild and domestic animals as well as man. The wild, or game, animals do not get sick from the germs in their blood, however. Instead they serve as a reservoir of germs for the flies to spread.

Interferes with Development

The disease has dominated and seriously interfered with the development of about one-fourth of the continent of Africa, authorities state.

The number of disease-carrying tsetse flies in one area of bush country in Zululand dropped significantly following airplane spraying of DDT, Dr. P. J. du Toit, director of veterinary services, Union of South Africa, reports.

The test area was 100 square miles. Flying across wind at 120 miles per hour at a height of about 50 feet, South African Air Force pilots laid down a dense white smoke of DDT across a swath 70 yards wide. About 50 acres per minute were sprayed. Up to six aircraft were used at a time, succeeding ones following the leader at intervals and taking alignment at the edge of the visible spray left in front.

Cost of spraying the 100 square miles was about 40 cents an acre for the DDT and 20 cents per acre for the aircraft services. The area was treated this way

six times. Elaborate tests were made of the actual spread of the DDT in the bush country. Where there were breaks in the ground because of small ravines, the spread was uneven. DDT grenades placed by hand were used to supplement the spraying at such places. Previous trials of entirely hand-operated spraying from the ground, however, had proved unsuitable because there was not enough penetration of the foliage. The time and number of workers needed also were so great as to make the hand ground spraying impractical.

Survival of Flies Small

The flies were not entirely wiped out by the combined ground and air spraying, but the numbers that survived were exceedingly small. The tsetse fly reproduces slowly and there have been instances of it disappearing from a heavily infested area when its animal food supply was greatly reduced. So presumably there is hope that if DDT can reduce the number of flies drastically, the remaining ones may gradually die out.

This Zululand spraying was a pilot experiment, and an enormous amount of work will be needed before the relative value of this or any other method of control can be assessed, Dr. du Toit stated in a report to the London School of Hygiene and Tropical Medicine.

The experiment has, he said, "provided certain definite and significant results."

"Where the fly was a nuisance to individuals working in or passing through the area, they are now rarely noticed."

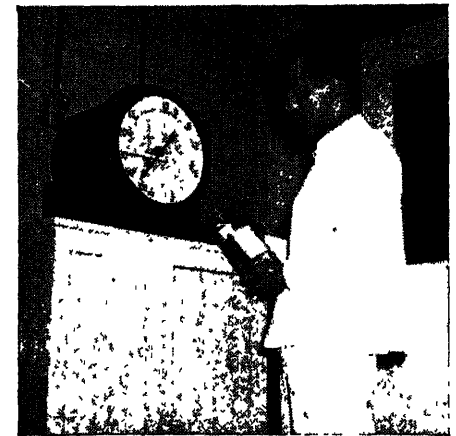
"Sufficient has been done in Africa to justify a tremendously increased scale of operations against the tsetse fly. The amount of money spent on research on methods of controlling the fly since Africa has been developed by the white race has been pitifully small in comparison with the harm it causes and the extent to which it limits the utilization of land potentially valuable for husbandry and other purposes. Here is a problem which requires costly and large-scale research. If very large tracts could be made available as a result of experimentation, the money would be well spent.

"It is of course to be understood," Dr. du Toit added, "that hand in hand with successful tsetse fly control in tropical Africa measures for dealing with prevalent social and agricultural systems that lead to over-stocking and consequent soil erosion would require attention. Not one of the least important problems would be the provision of adequate water supplies for livestock and efficient use of such water."

Details of the experiment have just reached scientists through the English scientific journal, *Nature* (Oct. 11). Other, unpublished reports of the work have come directly to the U. S. Department of Agriculture from government agriculture officials in England, and they have also heard that the Belgians were undertaking similar DDT anti-tsetse fly work in the Belgian Congo.

Science News Letter, November 15, 1947

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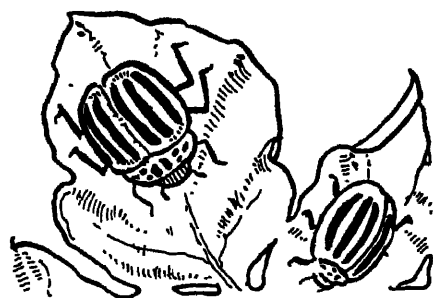
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ENTOMOLOGY

NATURE RAMBLINGS

by Frank Thone



Tax on Food

➤ SHARING our food with the needy of other lands will be warmly debated in the coming weeks. But we are already sharing our food with other hungry mouths, to the extent of more than 10% of every year's crop, and getting not so much as a "thank you" in return. Worse

still, we eat at second table, only after these other uninvited guests have helped themselves; we take what insects choose to leave us.

The insect world's tax on American food is discussed in some detail in a chapter of a new book, *Insects and Human Welfare*, by Dr. Charles T. Brues, veteran Harvard entomologist, published in Cambridge by Harvard University Press.

Taking an average of ten pre-war years, Dr. Brues estimates that insects annually devoured or spoiled \$231,150,000 worth of the \$2,890,000,000 cereal crop, \$92,700,000 worth of the \$1,043,000,000 total of truck and garden crops, \$125,000,000 worth out of a total of \$2,500,000,000 in animal products, with proportionate losses to other crops adding up to a grand total of \$998,000,000 damage to food crops worth, altogether, \$7,798,000,000.

The damage that insects do to food and other crops is more readily understood when Dr. Brues brings in his

chart of the feeding habits of all known species of insects. Of the 800,000 or so species, nearly half feed directly on plant tissues. Even though the majority of these live on plants of no economic significance, there are enough of highly numerous and very hungry species to account for all the listed losses.

Partly offsetting these harmful insects are other species that have to be counted as man's unconscious allies, such as the tiny wasps and flies that lay their eggs on the eggs or grubs of larger insects and so cause their destruction, or the lady-bird beetles with their tiger-like appetites for the flesh of six-legged prey. However, biological controls of this kind can only mitigate the damage, not stop it completely or even minimize it.

As one means of defense against the swarming, hungry hordes, Dr. Brues suggests seeking crop plants less liable to insect visitation; for example, the possible substitution of the little-bothered root crops, dasheen and Jerusalem artichoke, for the pest-ridden potato

Science News Letter, November 15, 1947

MEDICINE

TB Treatment on Trial

➤ A NEW chemical treatment of tuberculosis is now under trial by the Mayo Clinic and Minnesota physicians who first showed the possibilities of streptomycin in TB.

The chemical is para-aminosalicylic acid, a distant relative of aspirin. It is called PAS for short. For the past few months trials of it have been under way under the supervision of Dr. David Carr of the Mayo Clinic and Dr. Karl Pfuetze, of Mineral Springs Sanatorium, Dr. H. Corwin Hinshaw reported at a staff meeting of the Mayo Clinic.

Tests of the chemical on guinea pigs with tuberculosis were reported at the same time by Drs. William H. Feldman, Alfred G. Karlson and Dr. Hinshaw.

The new drug is not as powerful as streptomycin, "if it has any value at all," Dr. Hinshaw stated in reference to the work with the patients.

In spite of this rather unfavorable impression, the doctors apparently consider the drug worth further trial. It has the obvious advantages of being a drug that is produced synthetically, instead of having to be extracted from a mold, and of being one that can be swallowed like a pill instead of being injected.

It may prove valuable in combination with streptomycin. Tests of this in guinea

pigs are being made. Given by itself to guinea pigs with tuberculosis, PAS had a marked effect in stopping the disease. Only eight of 17 treated animals died of TB, compared with 16 out of 20 untreated ones.

The possibility of PAS becoming a remedy for tuberculosis was discovered by a Swedish scientist, Dr. Jorgen Lehmann. Dr. Guy P. Youmans of Northwestern University Medical School in Chicago confirmed the Swedish results in laboratory tests with mice. Dr. Youmans has also been testing the combination of PAS with streptomycin in mice with tuberculosis. The results were "impressive," he told the Mayo group.

Whether streptomycin, PAS or some still undiscovered and more powerful drug becomes a real cure for the white plague, "the virtual conquest of tuberculosis in America in our lifetime" is seen by Dr. Hinshaw as likely.

He bases this hopeful view on the rapid progress in tuberculosis research, increased financial support for it from the federal government and the American Trudeau Society, improved methods of diagnosis and treatment and the "greatly improved public attitude" which are all developments of the past few years.

Science News Letter, November 15, 1947

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BOMBS AT BIKINI—The Official Report of Operation Crossroads—W. A. Shurcliff, under the direction of the Commander, Joint Task Force One—Wise, 212 p., illus., \$3.50. Counterpart to OPERATION CROSSROADS, this work presents the technical history of the Bikini expedition, and summarizes all data which can be released to the public, including an account of the development of the expedition and of the preliminary preparations for it.

THE CATS OF WILDCAT HILL—Charis Wilson and Edward Weston—Duell, Sloan, 90 p., illus., \$3.75. A score or more of cats—their lives, their feelings, their antics—told by the people who befriended them.

CHEMISTRY MADE EASY—Louis T. Masson—School Science Press, 416 p., illus., \$1.79. This third volume of the series, Science Made Easy, presents chemistry in terms readily understandable by the high school student.

COMMITTEE OF EUROPEAN ECONOMIC CO-OPERATION—Vol. I: General report—September 21, 1947—Department of State Publication 2930, European Series 28—Govt. Printing, 138 p., paper, 30 cents. Program for recovery, drawn up by 16 European nations acting in concert, and including statements of production, requirements, and future plans agreed upon by the participating countries.

THE EDMONTON, KENTUCKY, METEORITE—E. P. Henderson and S. H. Perry—Smithsonian Inst., 4 p., illus., paper, 20 cents. Smithsonian Misc. Coll. Vol. 107, No. 13.

GRASSY ISLAND—Frederick Johnson and Hugh M. Raup—Robert S. Peabody Found. for Archaeology. Vol. I, No. II, 68 p., illus., paper, \$1.00. Archaeological investigations of an Indian camp-site in Massachusetts which may date back to the time of exploration of America by the Vikings.

HENRY FORD—Cy Caldwell—Messner, 246 p., illus., \$2.75. A biography of this great industrial pioneer and the story of how his inventions modernized transportation, industry, and world economies.

HOW OUR MINDS WORK—C. E. M. Joad—Philosophical Lib., 116 p., \$2.75. A philosophical interpretation of the influence of mind on body, based on William James' theory of emotions.

INFRA-RED FILTERS AND CELLS OF UNPOLISHED SALT CRYSTALS—J. J. McGovern and R. A. Friedel—Mellon Inst., 4 p., paper. Free from: Mellon Institute, Pittsburgh, Pa.

INVESTIGATION OF GOVERNMENT PATENT PRACTICES AND POLICIES—Report and Recommendations of the Attorney General to the President—Gov't. Printing, paper. Vol. I—Final Report Proper—35 cents; Vol. II—Monographs on Governmental Departments and Agencies—\$1.00; Vol. III—Monographs on Non-governmental Organizations, Foreign Countries, Legal and Historical Studies,

and Bibliography—65 cents

MEDICINE FOR MODERNS—Frank G. Slaughter—Messner, 242 p., \$3.50. A book written by a physician for laymen on the close relationship of mind and body in producing illnesses.

THE MIND IN ACTION—Eric Berne—Simon and Schuster, 320 p., \$3.00. A book intended to acquaint laymen with psychiatry. It contains an appendix on "Beyond Science."

POISONOUS DWELLERS OF THE DESERT—Natt N. Dodge—Southwestern Monuments Assn., 44 p., illus., paper, 50 cents. This copiously illustrated booklet describes the poisonous desert creatures, suggesting remedies for their bites, it also explodes many myths concerning them and includes a chapter on harmless animals popularly believed to be poisonous.

RADAR SYSTEM ENGINEERING—Louis N. Ridenour—McGraw-Hill, 748 p., illus., \$7.50. This first volume in the Massachusetts Institute of Technology's Radiation Laboratory Series seeks to provide basic information and serve as a reference book in the application of radar.

SAINT CROIX The Sentinel River—Guy Murchie—Duell, Sloan, 281 p., illus., \$3.50. Well-documented and illustrated, this book recounts the history of the St. Croix river from the time of its earliest discovery and settlement to the present.

SCIENCE AND PUBLIC POLICY: Vol. 3—Administration for Research—John R. Steelman—Govt. Printing, 324 p., paper, 55 cents. Chiefly concerned with effective administration of the government's scientific research program, including the planning and evaluating of activities and the handling of scientific personnel.

SCIENCE AND PUBLIC POLICY: Vol. 4—Manpower for Research—John R. Steelman—Govt. Printing, 166 p., paper, 35 cents. Volume IV of the Report of the President's Scientific Research Board discusses the scarcity of well-trained scientists for teaching and research posts, and outlines a program to remedy the situation, calling for Federal aid to colleges and universities and to individual qualified students.

SCOLIOSIS—Beatrice Woodcock—Stanford Univ. Press, 111 p., illus., \$2.00. For physical therapists, this book presents a practical guide to aid in the treatment of this disease.

SEQUENTIAL ANALYSIS—Abraham Wald—Wiley, 212 p., \$4.00. An important new technique in statistical analysis for testing hypotheses, treated for the first time in book length, knowledge of college algebra and some calculus is assumed.

SIMPLIFIED DIABETIC MANUAL—Abraham Rudy, rev. by Martin M. Nothman—Barrows, 4th ed., illus., \$3.00. A practical manual which describes recent developments in the treatment of diabetes as well as including many recipes and suggested menus for dietary control of the disease.

THE STORY OF HYPNOTISM—Robert W. Marks—Prentice-Hall 246 p., \$3.00. A popular account of hypnosis and its history.

THEORY OF THE PERFORMANCE OF PACKED RECTIFYING COLUMNS—John R. Bowman and R. C. Briant—7 p., paper. Free from Mellon Institute, Pittsburgh, Pa.

YOUR SOLAR HOUSE—Marion J. Simon—Simon and Schuster, 125 p., paper, \$1.00, cloth, \$3.00. Presents floor plans for solar living for each state of the union, designed by leading architects, many questions concerning solar heating are answered.

Science News Letter, November 15, 1947

CHEMISTRY-NUCLEAR PHYSICS

Medal Awarded Co-Finder Of Atomic Energy Elements

➤ THE co-discoverer of the elements plutonium, americium and curium, has been awarded one of the highest honors in chemical science. Dr. Glenn T. Seaborg of the University of California will receive the William H. Nichols Medal of the New York Section of the American Chemical Society for 1948, it has been announced by Dr. Vincent du Vigneaud, of the Cornell University Medical College, chairman of the jury of award.

Science News Letter, November 15, 1947

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☼ **ICE-CUBE TRAY** for the refrigerator is made of a synthetic rubber-like plastic in separated compartments joined only at the rim. When the tray is twisted the cubes pop out with only slight pressure because the ice does not stick to the wax-like surface of the plastic.

Science News Letter, November 15, 1947

☼ **POCKET SCALES** for fishermen is an L-shaped device about two inches long with a loop for the forefinger in the angle of the "L." It has a hook below for the attachment of a fish and can weigh up to eight pounds. The device also contains a two-foot tape to measure the length of the catch.

Science News Letter, November 15, 1947

☼ **GAS METER**, to study gas flow in commercial pipelines, is based on a strain-gauge whose electrical resistance varies when it is stretched or squeezed. Attached to it, but inside the pipe on a steel spring, is a small aluminum float which sways with the changes in gas movement.

Science News Letter, November 15, 1947

☼ **TELEPHONE HANDSET**, recently patented, has an automatic locking device to hold it on its ordinary support when not in use. When grasped by the hand, pressure of the thumb releases the handset, permitting it to be removed from the support.

Science News Letter, November 15, 1947

☼ **WATER AERATOR** delivers foaming water filled with air that will not



splash as it hits a pane of glass, as shown in the picture. A perforated brass disk inside, and a series of screens, convert the water into tiny particles mixed with air. It can be used on a faucet or the end of a hose.

Science News Letter, November 15, 1947

☼ **PIPE BOWL cleaner** for the smoker has a number of blades with cutting edges that are easily rotated around a central shaft placed in the center of the bowl. This device, just patented, scrapes the inside of the pipe free of all foreign materials.

Science News Letter, November 15, 1947

☼ **RADIO attachment** is an automatic device to bring in radio programs

wanted from any station any time of the day. It will also "pipe" programs over certain loud-speakers and not over others, such as children's programs into their playrooms, and can switch in a television set on schedule.

Science News Letter, November 15, 1947

☼ **HAND-GRIP**, a plastic device for holding the fingers in position while manicuring, has a hole for the thumb and grooves for the fingers which keep them separated and steady. Nail polish can be applied without smudge or smear.

Science News Letter, November 15, 1947

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Question Box

ECOLOGY

What role are botanists playing in the campaign against the mosquito? p. 311.

ENTOMOLOGY-PUBLIC HEALTH

What vast area may DDT make habitable? p. 317.

GENERAL SCIENCE

What does UNESCO hope to accomplish? p. 307.

MEDICINE

Against what disease will wide-scale tests of a new vaccine be made? p. 309.

To what does a condition like athlete's foot make one allergic? p. 308.

What clue to the aging process has been found? p. 310.

What new chemical is on trial for treatment of tuberculosis? p. 318.

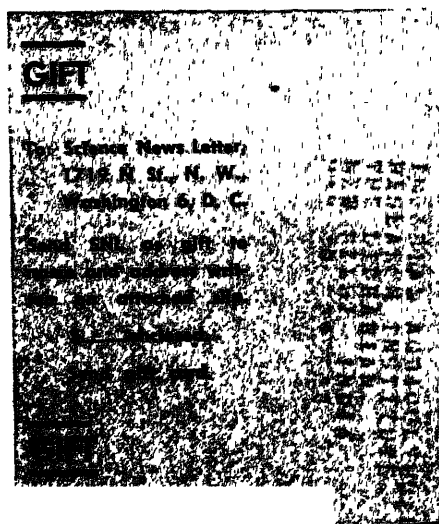
PHYSIOLOGY-CHEMISTRY

What dangers lie in the use of X-rays or atom bomb by-products to remove hair? p. 309.

PUBLIC HEALTH

What animals have been found guilty of transmitting two more diseases to man? p. 316.

Photographs: Cover, Ballistic Research Laboratories; p. 307, United States Radiator Corporation; p. 309, Prof. B. T. Wherry, U. of Penn.; p. 310, 311, Rev. Hugh O'Neill; p. 315, Bituminous Coal Ind.



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SCIENCE NEWS LETTER



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GENERAL SCIENCE

Science Under Controversy

Behind the scenes at the UNESCO meeting scientific work appears to be criticized and viewed with skepticism. No scientists in basic education conference.

By WATSON DAVIS

From Mexico City

➤ SCIENCE is getting a big hand in public at the UNESCO conference in Mexico City, but behind the scenes some stiff punches are being landed by the administrators, the mass media enthusiasts and others a bit afraid of the scientists.

President Miguel Aleman of Mexico told the delegates. "The task before UNESCO is to promote science and to find ways and means whereby all nations shall share the benefits and collaborate in its development, under condition that culture preside over those benefits and that collaboration. For this, education is indispensable, both in the sense of instruction and in its higher meaning of moral guidance."

This keynoting by the Mexican president arises out of an extensive effort to put facts and knowledge at the service of a people still in a relatively primitive culture.

Dr. Julian Huxley, UNESCO director-general, and Dr. Joseph Needham, sciences chief, both leading British scientists, have set in motion projects that will both increase knowledge and spread knowledge of what is known.

There is a project to explore and bring under control one of the last big geographic unknowns, the Amazon River basin that touches on seven countries. This would be a practical demonstration whose way of doing could be applied elsewhere, affecting people, resources and trade with all the world. Yet in the U. S. delegation there is a feeling that this may be too much of an operation for UNESCO to undertake.

For a week, basic or fundamental education—the way of getting a minimum knowledge to all—has been a special conference topic. Yet no scientists have sat in on this great prospective undertaking, although science even to the most elementary class is surely basic.

UNESCO has in the past year given courage and financial support to 14 international science bodies, allowing them to do projects and make world plans. This is the first time a world govern-

mental body has done such an obvious, practical thing. Yet there may be criticism of this action.

The Paris office of UNESCO has acted as a clearing house for scientists who want to find out what is happening elsewhere or want to join in international projects. And a start has been made in establishing regional offices for science—in Brazil, China, India and Egypt. This liaison work seems to have drawn little criticism.

To war-devastated sections of the world, UNESCO scientists have sent apparatus and books. One effective operation was the purchase of small machine shops and tool sets from war surplus and the placing of them in universities and science centers that need them.

Science News Letter, November 22, 1947

GENETICS

Some Hereditary Traits Passed on by Plasmagenes

➤ INHERITANCE of such characters as hair color and seed shape in animals and plants is not determined entirely by the invisible genes that are handed down strictly in or on the chromosomes in the cell nucleus, Prof. T. M. Sonneborn, Indiana University zoologist, declared

in a lecture before the University of Missouri chapter of Sigma Xi, national science honor society. Some hereditary traits pass from one generation to another by means of what he calls plasmagenes, which are carried in the general protoplasm of the cell rather than in the highly specialized little nuclear rods and spheres.

Prof. Sonneborn first discovered plasmagenes in the lively microscopic animals of the group known as Paramecium, sometimes called "slipper animalcules" because of their shape. Most of the inherited characters in Paramecium are passed along from one generation to another in quite orthodox genetic fashion, in or on the chromosomes. But Prof. Sonneborn found that one exceedingly important character in some strains of the animal—its ability to produce a substance highly toxic to other strains—is transmitted entirely through something found only outside the nucleus and in the general body protoplasm. So he named these the plasmagenes.

One highly significant difference between plasmagenes and "regular" genes is that while the latter are rearranged and transmitted only in the process of sexual reproduction, in a manner predictable with mathematical exactness, plasmagenes do not depend on union of male and female elements for their realignments, and may be passed from parent to offspring without regard to Mendelian mathematics.

For the researches that led up to the discovery of the plasmagenes, Prof. Sonneborn was awarded the annual \$1,000 prize of the American Association for the Advancement of Science.

Science News Letter, November 22, 1947

MEDICINE

Subtilin Checks TB Germ

➤ EVIDENCE, believed conclusive, that subtilin, a new cousin of penicillin, inhibits the tuberculosis germ, has been reported by scientists in the University of California Medical School.

Dr. Hamilton H. Anderson, professor of pharmacology, and Sam C. Wong and Alvin S. Hambly, research associates, have completed studies of the antibiotic in different media.

Results indicate that the drug cannot be introduced into the body in sufficient amounts to kill the tuberculosis germ; but that concentrations can be obtained which will inhibit its growth.

Eventual use of subtilin in man is indicated by its low toxicity and marked inhibition of the tuberculosis germ, Dr. Anderson said.

While subtilin had been suggested previously as an agent against tuberculosis, experiments on its effectiveness had been previously inconclusive.

Dr. Hamilton did the research in collaboration with the Western Regional Research Laboratory, U. S. Department of Agriculture, Albany, Calif., and Dr. A. J. Salle, of the department of bacteriology on the Los Angeles campus of the University of California.

Science News Letter, November 22, 1947

PHYSICS-CHEMISTRY

Nobel Prizes Awarded

Honors in physics and chemistry were won by a pioneer investigator of the ionosphere and a chemist who worked on the synthesis of penicillin.

➤ TWO leading British scientists, a pioneer in radio transmission and a chemist who worked on penicillin, have won the 1947 Nobel prizes in physics and chemistry.

The winners are Sir Edward V. Appleton, physicist and secretary of Britain's Department of Scientific and Industrial Research, and Sir Robert Robinson, Oxford University chemist. This year's other Nobel award in science was the prize in medicine and physiology, shared by the American husband-wife team of Carl F. and Gerty Cori of Washington University, St. Louis, and Dr. Bernard Houssay of Argentina. (See SNL, Nov 1.)

Radio listeners throughout the world owe thanks to Sir Edward. His fundamental researches have contributed much to the clearness with which broadcasts from distant lands come through today.

A pioneer investigator of the ionosphere or "radio roof" surrounding the earth, Sir Edward proved by direct experiment the existence of the layer of ionized atoms 115 miles or so above the earth, present both day and night. This layer is the one that reflects shortwave radio waves at night.

The invisible reflecting layers of the ionosphere have been the subject of intensive research since their existence was proved. Today calculation of their height is important in determining the best frequencies to use in getting a broadcast through.

High Frequency Waves

To determine their height, short pulses of high-frequency waves of different wavelengths are sent into the ionosphere. The time it takes the waves to go up and back is then determined. It is easy to tell how far a radio echo has traveled because the speed of radio waves is the same as light, which has been accurately calculated.

These layers change greatly from day to night, and from summer to winter. They are also greatly affected by activity on the sun. Changes in the layers, of course, in turn affect short-wave communication. When the layers are too thin,

radio signals fail to be reflected and broadcasts are blacked out.

The puzzle of how strychnine, powerful poison, is put together is the latest research on which Sir Robert has been working. At the International Chemical Congress in London this past summer he reported finding a close relation between quinine, the anti-malaria remedy, and part of strychnine's molecular skeleton. Unfortunately, there is no prospect in his opinion, of making quinine from strychnine because the natural molecules produced in the plants yielding these chemicals are molded in different ways.

Synthesis of Penicillin

During the war, Sir Robert and associates at Oxford worked on the synthesis of penicillin. Chemicals with penicillin activity were obtained almost simultaneously by the Oxford group and American scientists, but the amounts were so small as to cast some doubt at the time on whether or not penicillin had been synthesized.

The difficulty of obtaining synthetic penicillin in large enough amounts for

medical use was explained by Sir Robert at the time he received the Franklin Medal of the Franklin Institute in Philadelphia last March as follows:

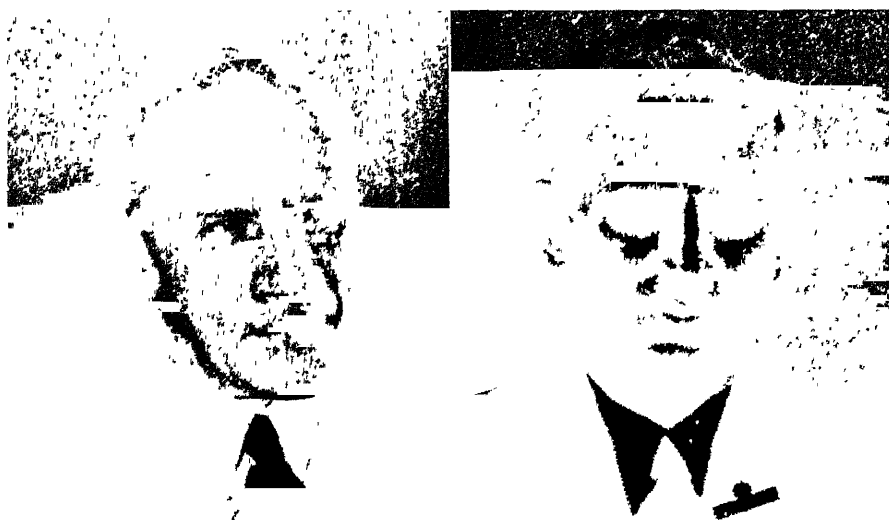
"Penicillin possesses a curious strained structure unique among natural products and this endows it with such reactivity that all the chemical processes tried (in synthesis) have so far proved too brutal. The molecule is of course stable enough to exist but it is easily thrown off its balance.

Difficulties Involved

"A ball can rest on a narrow shelf but if that is narrow enough and high enough it might be possible to find that the attempt to throw the ball on the shelf, so that it would remain there, would succeed only once in a thousand times. It seems that our chemical processes are too energetic and we have no equivalent to the certain method of placing the ball on the shelf by hand."

Last year's first Nobel prizes in science since the war were swept by American scientists. Dr. P. W. Bridgman of Harvard won the physics award; Dr. J. B. Sumner of Cornell University won half of the prize in chemistry, with Drs. W. M. Stanley and J. K. Northrop of the Rockefeller Institute for Medical Research sharing the other half; and the medicine and physiology award was made to Dr. Hermann J. Muller of Indiana University.

Science News Letter, November 22, 1947



NOBELISTS—Sir Robert Robinson, Oxford University chemist, and Sir Edward V. Appleton, physicist and secretary of Britain's Department of Scientific and Industrial Research, receive awards.

PUBLIC HEALTH

Longer Life Span Ahead

Within the next 10 or 20 years the average person may live to be 70 or more with the development of new disease-fighters and wider application of present ones.

➤ THE average length of life for the population of America should reach the biblical three score and 10 years within the next 10 or 20 years and may even go over the 70-year mark, statisticians of the Metropolitan Life Insurance Company predict.

The average life span in the United States has already reached 65.8 years. This is a gain of 16 years since the turn of the century. Expectation of lengthening the average life to 70 years or more is based on the probable development of new weapons to fight disease and wider application of present ones.

"It may well be," the statisticians speculate, "that medical science is now at the threshold of discoveries in the fields of cancer and of the degenerative diseases, which knowledge, when crystallized and applied may add significantly to the biblical three score and ten."

Pneumonia and influenza are rapidly becoming minor causes of death. They now rank eighth as cause of death among the company's industrial policyholders whereas 10 years ago they were outranked as killers only by heart disease and cancer. They now take less than four of every 100 who die, whereas 10 years ago pneumonia and influenza accounted for 10 out of every 100 deaths from all causes combined.

A new record low death rate for tuberculosis was established during the first nine months of the current year among the industrial policyholders. The death rate from this disease is already below 35 per 100,000 whereas 10 years ago it was about 50 per 100,000 and 20 years ago almost 100 per 100,000.

New record low death rates were established so far this year for three of the four principal diseases of childhood, measles, scarlet fever and whooping cough, and for appendicitis.

The death rate from acute poliomyelitis declined sharply, reaching 0.4 per 100,000 although this is not a minimum.

Deaths from heart, blood vessel and kidney disease now make up about half the deaths from disease among the industrial policyholders and increased slightly over last year. Cancer, accounting for one-sixth of the total deaths, reached

a new high mortality for this period of the year.

The increases in cancer and heart, blood vessel and kidney disease, it is pointed out, reflect in appreciable measure the change to older age in the population group studied.

Diabetes mortality dropped slightly. So did mortality from suicides and accidents. The mortality from home accidents was the lowest in our history and the motor vehicle fatality rate is the lowest for any peacetime year since 1922.

Science News Letter, November 22, 1947

NUTRITION

Home Economics Students Eating On Dollar a Day

➤ WORRIED about the high cost of living? Six seniors in home economics at Cornell University and their instructor are eating on \$1 a day or less per person.

Not in the least thin or emaciated, the co-eds are spending seven weeks of practical homemaking in a seven-room apartment in a college hall, and they are proving that well-planned, balanced and varied meals needn't be expensive.

In fact, one week's meals averaged 85 cents daily per person.

Meals are planned and prepared by a "cook" and "assistant cook," whose identity changes each week, and all marketing is done in local stores. The girls keep an eye out for "specials" and seasonal foods, and inexpensive meat cuts to help them keep within their budget. Marketing is done twice a week.

Far from frugal, a typical menu includes for breakfast: fruit juice, scrambled eggs, toast, jelly, milk or coffee. Lunch: Welch rabbit with bacon curls, lettuce and tomato salad, stewed apricots, cookies and milk. Dinner: Salmon loaf with egg sauce, snap beans, baked potatoes, shredded carrot and raisin salad, gingerbread with lemon sauce, and demi-tasse.

On Tuesdays when no meat is served, the girls substitute cheese dishes—fondue, soufflé, toasted sandwiches, macaroni casserole, and vegetable plates.

Luncheon sandwiches are sometimes open-faced to conserve bread.

The budget figure of \$1 a day was set last spring, so now, as prices rise, the girls must be even more economical.

One week, the average daily cost for meals hit 91 cents, but included in the week was a dessert bridge for 16—nine guests were invited. Pineapple mousse, chocolate macaroons, vanilla wafers, and coffee were served, and the budget could be stretched to include home-made chocolate raisin clusters.

In addition to cooking duties, the girls also act as housekeeper, assistant, manager, and even "mother" to a 4-months-old baby.

Science News Letter, November 22, 1947

SCIENCE NEWS LETTER

Vol. 52 NOVEMBER 22, 1947 No. 21

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS

Subscriptions—\$5 00 a year; two years, \$8 00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N. Y. C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, State 4439

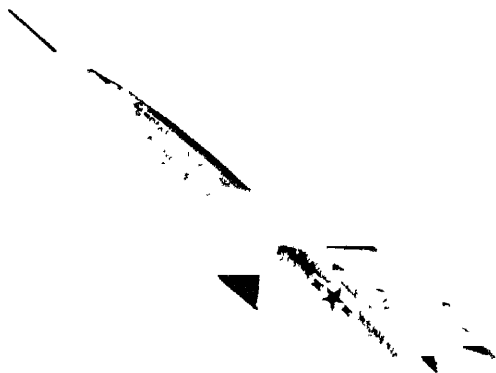
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WITH THE SPEED OF SOUND—This swordfish-like plane with its narrow sleek body and long lance-like pointed nose is the Navy Skyrocket. This winged V-2 has rocket power supplementing jet engine propulsion. It is a sister ship to the Skystreak which holds the world's official speed record.

AERONAUTICS

To Keep Pace with Sound

Rocket and jet powered, the Navy's Skyrocket is expected to fly at approximately 760 miles an hour, 100 miles faster than its sister ship the Skystreak.

➤ **ROCKET** power, supplementing jet engine propulsion, features the new Navy transonic Skyrocket plane revealed in El Segundo, Calif. It is a sister ship of the turbo-engined Douglas Skystreak, which now holds the world's official speed record of 650.8 miles an hour.

The new plane, dubbed a winged V-2, is designed to better this record by perhaps 100 miles, approaching the speed of sound, which is approximately 760 miles an hour at sealevel. It is a research craft, to gather information relative to problems encountered at those speeds.

The Skyrocket in appearance resembles a swordfish, with its narrow sleek body and long lance-like pointed nose. It is powered with a Westinghouse turbo-jet engine and with a rocket engine built by Reaction Motors, Inc. It can take off and cruise at high speeds with its ordinary jet propulsion, then sweep to higher speeds when the rocket engine is turned on. It is the first man-carrying flight machine to utilize a combination of jet

and rocket energy.

To be known as the D-558-2 by the Navy, the new plane is radically different in appearance from the D-558 Skystreak, because of its needle-like nose, its slimly tapered fuselage resembling a winged V-2 rocket, and its stubby swept-back wings which give a total wingspan of only 25 feet. The body of the plane is about 45 feet long. The pilot's enclosure is entirely within the fuselage, with no "bubble" to increase air drag.

Built to withstand the extreme strains at the speed of sound, the body of the new plane is made chiefly of magnesium alloy. Wing and tail faces are largely the tough aluminum alloy known as 75s.

The Skyrocket is a joint undertaking of the Navy, National Advisory Committee for Aeronautics, and Douglas Aircraft. It will undergo a test-flight program at the Air Force Test Center, Muroc Dry Lake, Calif., and then be turned over by the Navy to the NACA.

Science News Letter, November 22, 1947

ASTRONOMY

Galaxies Are Scattering Away from Each Other

➤ **THE** hundred-billion-odd galaxies, systems of stars like the Milky Way system of which the earth is a part, are flying away from each other so rapidly that eventually they may become lost in space. Cosmic repulsion or "negative gravitation" has set in so that clusters of billions of stars are scattering away from each other.

But the average density of matter throughout our planetary system and even throughout our galaxy, where stars are separated from each other by millions of light years, is so high that the tendency to scatter is overcome by the great gravitational forces involved. This view is stated by Dr. Harlow Shapley, director of Harvard Observatory, in the annual report of the Smithsonian Institution.

Even in a cluster of galaxies like the one in our vicinity—a cluster which includes our Milky Way galaxy, the Andromeda nebula and its companions, the Magellanic Clouds and half-a-dozen others—gravitation still controls the situation, Dr. Shapley states. Our cluster of galaxies is not dissolving under cosmic repulsion—at least not with marked rapidity. The cohesion that maintain our cluster apparently operates in a number of other close associations of galaxies. Their mean density is high enough for gravitational control.

But throughout the universe in general the mean density is perhaps only one-hundredth of that within the cluster of galaxies. It is too low for gravitation any longer to maintain the situation. The expansion that has set in under the repulsive force will still further lower the mean density. It therefore appears that we—the metagalaxy—are doomed to infinite dissipation.

At the same time that the earth is expanding, the heat of the stars is going out into cold space. The universe is steadily approaching a heat-death—a cold near absolute zero in an empty world.

We cannot be sure that the reverse building-up processes are not going on in some parts of the universe, Dr. Shapley points out. We see less than one percent of it. There is, however, no substantial evidence or argument for the cyclic restoration of heat and density. And some cosmogonists are bold enough to abstain from wishful thinking.

Science News Letter, November 22, 1947

AGRICULTURE

Europe's Dire Food Needs

Bad weather and disruption by the war of agricultural needs such as men, horses or tractors, seed and fertilizers, leave Europe on the brink of starvation.

By DR. FRANK THONE

➤ **EMERGENCY** food needs in Europe have forced a special session of Congress, which neither President Truman nor the assembled statesmen wanted. Yet here they are, and even those who went to Europe with their minds made up against helping the people there are for the most now ready to vote aid, even in terms of billions.

In the meantime, many Americans who have not had a chance to see present conditions in Europe are demanding, "Why help them at all? Isn't it their own fault if they're hungry? What have their farmers been doing for the past two years, anyway?"

These are simple questions, assuming the possibility of simple answers. Unfortunately, the farm situation in Europe is anything but as simple as the questions assume, hence simple answers are not possible.

Weather Woes

Simplest single factor, and the one most easily understood in this country because we ourselves had a taste of the same bitter medicine, was the wicked weather in 1947. For Europe, weather woes began with the fall of 1946, which ushered in the most bitterly cold, most violently windy, most burdensomely snowy winter in all the recorded history of the continent. Destructive floods over many fields in England, freezing of nearly half of France's winter wheat crop, are sample items from that winter's long tale of catastrophe.

The polar winter was followed by a Saharan summer. Drought destroyed much of what the cold had spared, just as drought scourged our own cornfields. Only in Europe the drought took toll of everything. In France, some of the winter-killed wheat had been replaced by spring-sown grain; drought struck this, too. Italy's wheat harvest dwindled before the scorching sun. In Germany, potatoes and fruits suffered along with grain crops.

But Europe's weather troubles came only as an added blow after all the scourings of the world's most terrible

war, like Job's curse of sore boils capping all his other losses and griefs. Even with a normal season, Europe would still be in deep trouble and needing help.

Most of this deep pit of trouble in which Europe is struggling was dug and blasted by the war. Agriculture has five great requirements, besides the basic land: it needs men, horses or tractors, implements, seed and fertilizer. The war killed men and horses or led them off into captivity, took for guns and shells the steel needed for tractors and plows, destroyed or ate up the seed, turned fertilizer chemicals into explosives and incendiaries. These violent dislocations cannot be set right in two years—hardly in 10.

Shortage of Manpower

The first requirement for farming, manpower, is going to be short in Europe's principal agricultural areas for at least that long. The dead cannot come back, and the underfed young are not growing up into strong farm workers. Not all the German war prisoners have been repatriated: there are some in England and France and an unknown but probably much larger number in Russia. There are thousands of displaced persons in western Europe—Baltics and Poles who fear to return to their former homes, Germans from Poland and the Sudetenland who could not return if they would. Those among them who are farmers have no fields to till where they are; the farms they once had are no longer part of the economy of western Europe. Finally, the farm-labor migrations that used to mark harvest-time—Poles into Germany, Italians into southern France—are stopped, at least for the present.

One other factor is not so much an actual lack of farm labor as lack of incentive to farmers. In France, farmers can sell their crops but can get nothing but money for them—they cannot buy anything they want with their money. So they either grow less grain, or feed part of their grain to their farm animals which replace the sock under the mattress as tangible savings. The Argentine government, which is the sole exporting agent for that country's grain, refuses

to pay even a third as much for the grain they buy as they get for what they sell in Europe. So the Argentine farmer cuts his acreage too. We may berate such conduct as selfish—but we'd better not do it within the hearing of any American farmer!

Farm horses and other draft animals are being bred again in Europe; but colts must be given a couple of years before they can be broken to the plow. And since there isn't enough grain to feed the human population, not very much can be spared for these competing mouths.

Slowly Recovering Factories

Tractors that might partly replace horses in front of the plows are not being built fast enough in Europe's slowly recovering factories: coal and steel are lacking, and undernourished factory workmen could not drive their machines at normal speed even if they had the raw materials.

Europe looks to America for farm implements as well as for tractors to pull them. We have sent many cargoes of this food-producing machinery and expect to increase these life-saving exports under the economic rehabilitation measures now pending. But the best we shall be able to do in 1948 will be only half enough to meet the stated needs of European lands.

The story of seed may be very briefly told: there simply isn't enough. We shall have to send considerable quantities. But no one, surely, will grudge this basic means of self-help.

The same story, with variations, might be told of the fourth great requirement of agriculture, fertilizers. In ordinary mixed commercial fertilizer three compounds bulk largest: phosphates, nitrates, potash. War has upset the fertilizer-cart, too, partly by cutting off sources, partly by interfering with transportation.

Nearest to normal is the phosphate situation. There are great phosphate-rock deposits in North Africa, which are being worked by the French; lesser sources on the Continent itself supplement this supply. But the whole European production is not enough; we shall have to supply some from our own none-too-well-stocked bins.

War's disruptive effects are felt most severely in the nitrate supply, for nitrates are materials for munitions as well as for fertilizers, and the great nitrogen-fixation plants of Germany were legitimate targets for the heaviest bombs that Allied planes could lug over them. Those that survived the bombings have not

been permitted to operate at more than a fraction of capacity, largely because of French fears of a resurgent German munitions industry. Our own fixation plants, geared mostly to war needs, adapt only slowly to peacetime production; though these are being put into use as fast as possible. The one great source of natural nitrate, the desert of northern Chile, is being worked for all it will yield; but there is a limit to the capacity of mining and handling machinery and to shipping space.

Potash presents Europe's greatest fertilizer anomaly. For many years the world's greatest source of potash has been a limited area near Stassfurt, in Saxony. We ourselves have been to a considerable extent dependent on German potash, although since World War I a sizable American industry in this mineral wealth has grown up. The post-war zoning of Germany has placed the Stassfurt potash mines under Soviet control. The Russians quite naturally have seen to it that their own needs are satisfied first, and are said to be demanding a rather high price for what potash they permit to move westward.

Even if, by some miracle or magic, all these dislocations in Europe's food-producing capacity could be immediately adjusted, Europe would still need food imports. Since the maturing of the industrial age, western Europe has always been an importer of food. Grain and meat have flowed to Britain, Germany, the Low Countries, Italy, from the United States, Canada, Australia, Argentina, South Africa. Industrial Germany has received grain from Russia and Poland, and from the latter country also

pork—which of course is to a major extent grain on the hoof.

From this country and the members of the British Commonwealth the food-export stream is not only remaining normal but is being accelerated. Australia especially has had a great crop, and is looking hopefully towards another, as spring gets well under way in the Southern Hemisphere. Argentina's wheat-price policy is cutting into that country's sales; Argentine farmers, as already mentioned, are reluctant to produce for what they can get, European consumers make only distress purchases at the high price Argentina demands.

The 1947 wheat crop in the USSR is said to have been very large—how large, though, nobody but the Soviet officials know. It is known that they offered Britain a two-million-bushel grain deal—one million bushels of wheat and one million of corn and other feed grains. However, the British government could not agree to the price asked, and it was no sale. Since then, 350,000 bushels of Russian wheat has been consigned to Poland, which country in turn has been selling part of its potato surplus to American buyers for use in Germany and Austria. Poland expects to have exportable wheat of her own when the 1948 harvest comes in.

This is only a very sketchy outline of the European farm and food situation, with most of the details left out lest the story become simply interminable. It should be enough, however, to give an inkling what a complex and difficult situation faces our legislators, administrators and economists.

Science News Letter, November 22, 1947

ELECTRONICS

Metal Detector for Logs

Hidden shells or metal fragments in trees can be located by new device so that the timber can be sawed into usable lumber.

► **HIDDEN** metal shells or fragments in logs are to be located with an electronic device, a "metal detector", reports General Electric. In the process the logs will be floated through a magnetic field set up by the detector coil system.

The device was perfected for the U. S. Army, and is being used on the Fort Lewis Military Reservation in Washington state where there are some 3,700 acres of forest containing many trees

which have hidden shells within them. No one seems to know where the shells came from, but the timber can not be sawed into usable lumber until the saw-destroying metal is removed. Some buried shells which had not exploded were found in logs, it is reported.

In use the device will be placed in water. When logs pass through the magnetic field set up by the detector coil system, an electronic circuit measures



SHELL DETECTOR—An electronic detector that will look like this apparatus will be used to find unexploded shells and metal fragments in trees being harvested at Fort Lewis, Washington.

the amount of voltage unbalance in the field created by any metal in them. If the unbalance is great enough, both visual and audible alarms are affected, and workmen can mark the section of the log containing the metal.

Science News Letter, November 22, 1947

ENGINEERING

Germs Removed from Water By Electric Precipitation

► **WATER** need no longer taste of chlorine to assure you of its safety, if the patent claims of G. P. Ham and Dr. R. B. Barnes, researchers for the American Cyanamid Company, are made good on a large scale. Their process, covered by newly-issued U. S. patents 2,428,328 and 2,428,329, gets the germs out of water by electrically precipitating them on sand or other granular dielectric material.

Typical setup consists of a cylindrical, rubber-lined tank containing a mass of sand separated into layers by thin mats of glass wool. Platinum electrodes, properly spaced, pass an electric current through the sand as the water filters through. The bacteria are not killed, but are found alive, adhering to sand grains in the uppermost layer. They may be destroyed in any manner desired, or saved alive for scientific use.

Science News Letter, November 22, 1947

ENGINEERING

Lightning Arrester Gives Zig-Zag Ride to Ground

See Front Cover

► THE WORLD'S three largest lightning arresters, which zig-zag lightning harmlessly into the ground, are protecting costly laboratory equipment on the new 500,000-volt experimental transmission line put into operation by the American Gas and Electric Service Corporation in Brilliant, Ohio.

Engineers hope to learn economical methods of sending greater blocks of electricity from generating plants into the industrial and residential centers where it is needed with the aid of this mammoth outdoor laboratory.

"Greased skids" for lightning are the three 29-foot-high legs of the gigantic tripod—actually the world's largest lightning arrester—appearing on the cover of this week's SCIENCE NEWS LETTER. The large metal rings surrounding the apparatus equalize the electrical pressure, preventing one segment from becoming overloaded while others are idling.

Science News Letter, November 22, 1947

ASTRONOMY

Bester's Comet Will Blaze In Heavens Early in 1948

► A COMET will blaze in the heavens early in 1948, giving an astronomical show in the sky that will remind old-timers of Halley's and other famous naked-eye comets.

At present the comet that astronomers hope will become prominently visible to unaided eyes is a faint blotch in the southern heavens. It was discovered late in September by M. J. Bester of the Harvard South African station.

Bester's comet, which you will be hearing much more about, is scheduled to move northward toward the Pole Star. Here it can easily be seen by observers in the United States and Canada.

Northern observers may possibly pick up the comet late in February, but the chances are slim that it will be spotted that soon. Although comet Bester will be brightest then, it will be so near the sun that it will probably be lost in the blaze of sunlight.

The comet will more probably be picked up early in March, calculates Dr. Island E. Cunningham of Students' Observatory, University of California. Then it will have moved farther away from

the vicinity of the sun, toward which it is now speeding.

Moving rapidly northward, the bright comet will probably just suddenly appear. When found, it may rival in brilliance many of the well-known landmarks of the heavens. In brightness it may be between second and third magnitude (stars as faint as the sixth magnitude can be seen with the unaided eye), Dr. Cunningham estimates. This will make it an easy object to spot as it makes its way across the night sky.

This comet is only one of four bearing the name of Bester and now visible in the sky. One has the double name Rondanini-Bester as two people are credited with spotting it. Three of these comets were discovered this year, one last year. Right now they are all too faint to be seen without the aid of a good telescope.

Mr. Bester's find of last year is still easily visible with a good telescope, and is likely to remain so for several months more. His first comet of this year, the Rondanini-Bester comet, is now exceedingly faint, but will probably be followed by astronomers for another month or so. Mr. Bester's second comet of 1947 was followed until early August, at which time it was very faint. It is still in observing position and may be picked up again.

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ENGINEERING

Wartime Landing Ships May Open Up New Waterways

► WORLD WAR II's ugliest ships, the awkward but important landing craft, may be used to open up commercial shipping in some of the world's undeveloped waterways.

This peacetime use for some of the surplus landing ships and craft left over from the war is proposed in the industrial bulletin of Arthur D. Little, Inc., Cambridge, Mass. LST's (Landing Ship, Tanks), LSM's (Landing Ship, Medium) and the other members of the Navy's wartime amphibious family could be used in such places as the Amazon River where they might open up new commerce.

Attempts to use the surplus ships in American waters have met stiff opposition from established transportation systems but in places where there are no docks and loading facilities for other ships, the landing ships might make new, peaceful commercial "invasions."

*Science News Letter, November 22, 1947***IN SCIENCE**

ASTRONOMY

Sun's Life Is Limited to Ten Billion More Years

► THE sun will probably finish its life in about 10,000,000,000 years by becoming fainter and fainter until no longer able to support life on earth and other planets, Prof. George Gamow of George Washington University stated at the Cooper Union forum, in New York.

He based his prediction on the present rate of burning of the fuel supply in the sun. "The detailed study of possible reactions (in the sun)," he said, "leads to the conclusion that in the case of the sun, nuclear process represents the steady transformation of hydrogen into helium helped by catalytic action of carbon and nitrogen."

At the interior temperature of the sun, which is 20,000,000 degrees, only the comparatively light elements are subject to nuclear transformations. To get the energy from heavier elements, the temperatures of billions of degrees would be necessary.

"Most of the stars use the same energy-producing process, but do so at different rates," Prof. Gamow added. "Such brilliant stars as Sirius are apt to use up the hydrogen fuel much sooner, and are expected to collapse in a process resembling a terrific explosion."

Science News Letter, November 22, 1947

PHOTOGRAPHY

Large Television Pictures Made with Correcting Lens

► THEATER-SIZE television pictures are now obtained by use of a large spherical mirror and a large correcting lens, Radio Corporation of America has revealed. The screen image may be 18 by 24 feet.

The new projector, yet in experimental stage, will be publicly demonstrated in the near future. It employs a 15-inch cathode-ray picture tube, a 42-inch spherical mirror, and a 36-inch aspherical correcting lens of the Schmidt type. The lens is said to be the largest Schmidt type system in the world except for the 72-inch Schmidt telescope on Mt. Wilson, Calif., which is not yet in operation.

Science News Letter, November 22, 1947

THE FIELDS

GENERAL SCIENCE

Psychiatrists Unprepared To Advise WHO or UNESCO

➤ **PSYCHIATRISTS**, social scientists, social workers and educators are unprepared to advise the World Health Organization and UNESCO, Dr. Harry Stack Sullivan of Washington, D. C., declared at the meeting of the National Committee for Mental Hygiene. He expressed doubt that many scientists are ready to generalize their work on a world scale or open their minds to scientific study of living where people have quite different standards.

World citizens who are not already outstanding community citizens will be few, Dr. Sullivan declared. Prime contribution to the coming of world citizenship is integration of communities and broadening them into greater communities of likeminded people of good will. WHO's constitution, which covers mental and social well being as well as prevention of disease, can be credited, Dr. Sullivan said, to the efforts in the preparatory meeting at Geneva of Dr. Brock Chisholm, Canadian psychiatrist who is now executive secretary of WHO's interim commission.

Science News Letter, November 22, 1947

GENERAL SCIENCE

Nine States Enter Search For Youthful Scientists

➤ **HIGH SCHOOL** seniors in nine states will be getting two-for-one service when they enter the Seventh Annual Science Talent Search for the Westinghouse Science Scholarships this fall.

Boys and girls in nine states planning to be scientists will be entering a state competition when they comply with the rigid requirements of the national competition ending midnight, Dec. 26. (See SNL, Oct. 4). Cooperating states are Alabama, Georgia, Illinois, Iowa, Louisiana, Montana, Pennsylvania, Tennessee and Virginia.

Through a special arrangement with Science Clubs of America, administered by Science Service, which conducts the national Search annually, nine states will have state science talent searches concurrently with the national.

Budgets, ranging from a few hundred dollars to \$9,000, have been set up by organizations of scientists, educators and industrialists to award scholarships or other financial assistance to talented high school students of science in their respective states.

Widespread interest on the part of State Academies of Science, educator groups and scientific industries makes possible the state science talent searches. The number of students honored in a state may range from three to 42 and the awards vary from small savings bonds to four-year scholarships in state schools of the winners choosing.

Persons in charge of state science talent searches are as follows:

Alabama. Dr. James I. Kassner, Sec. General Gorgas Scholarship Committee, P O Box H, University, Ala.

Georgia. Alvin I. McLendon, Jr., Chm. Jr. Acad. Com., Ga. Acad. of Science, Principal, Box 171 Statesboro High School, Statesboro, Ga.

Illinois. Dr. Lyell J. Thomas, Chm., Ill. State Science Talent Search, University of Illinois, Champaign, Ill.

Iowa. Dr. F. E. Brown, Chm., High School Relations Com. of Iowa Acad. of Science, Professor of Chemistry, Iowa State College, Ames, Iowa.

Louisiana. Bert B. Boyd, Dir., La. Jr. Acad. of Science, Science Dept., Northwestern State College, Natchitoches, La.

Montana. Adrien L. Hess, Dept. of Mathematics, Montana State College, Bozeman, Montana.

Pennsylvania. Sophia M. Moiles, Chm., Dept. of Physics, Johnstown Central High School, Johnstown, Pa.

Tennessee. Jacob H. Shapiro, Columbia High School, Columbia, Tenn.

Virginia. Dr. James W. Cole, Jr., Cobb Chemical Laboratory, University of Virginia, Charlottesville, Va.

Science News Letter, November 22, 1947

GEOLOGY

Publicity Effort Blamed For New Volcano Report

➤ **INVESTIGATION** by an American geologist, Dr. Ivan Wilson, of the American embassy in Mexico City, has dashed hopes that a new volcano is being born in Mexico.

A few weeks ago, reports intimated that another Paricutin was appearing near Rio Blanco in Vera Cruz state, a region known to contain hot springs. Inspection showed no real volcano. The eruption report was publicity intended to attract tourists.

A veteran Mexican volcano scientist, Dr. Ezequiel Ordonez, called the phenomenon a fumarole, a hole from which gases or fumes issue.

Science News Letter, November 22, 1947

MEDICINE

War Gas Chemical Used To Treat Skin Disease

➤ Nitrogen mustard, war gas chemical which has become one of medicine's new weapons against disease, has now been used with apparently good results in treatment of a rare but usually fatal skin disease.

The case is reported by Drs. O. S. Philpott, A. R. Woodburne and G. A. Waldriff, of the University of Colorado School of Medicine and Hospitals, in the *Journal of the American Medical Association* (Nov. 8).

The skin disease they treated is called mycosis fungoides. It is not, as its name might suggest, a fungus infection. Its cause is unknown. It is believed related to leukemia and Hodgkin's disease. Hard reddish tumors of the skin which tend to spread and ulcerate are its characteristic symptoms.

The patient reported by the Denver physicians was a 79-year-old man who had had the skin trouble for four years. He left the hospital against the doctors' advice and died several weeks later, so whether he would have been cured is not known.

The war gas chemical seemed "extremely effective," the doctors reported, in stopping the itching caused by the disease. The tumors rapidly disappeared, leaving the dark spots on the skin. The nitrogen mustard was given by injection into the patient's vein. Four doses, one each day, had been planned, but the fourth dose could not be given because the patient had nausea, loss of appetite and drop in blood platelets.

Somewhat smaller doses of nitrogen mustard, the doctors believe, might be safer and equally effective.

Science News Letter, November 22, 1947

WILD LIFE

Tiny Beavers Thrown Away In Wide Search for Them

➤ **FOUR** tiny beavers, only five days old, were almost thrown away in a hunt for them by a motion picture enthusiast, T. J. Courtney of Halifax, Nova Scotia. Hidden in a ball of grass, the squeaks of the young led to their discovery.

The baby beavers, only five inches long and fully furred, were finally located in a mass of meadow grass which the guide removed from the beaver house during his search, Mr. Courtney states in the *Journal of Mammalogy*.

Science News Letter, November 22, 1947

NUTRITION

Skeleton at the Feast

A "thanksgiving" day dinner in Austria, Poland, or Germany, might be a bowl of potato soup. It might include a few leaves of cabbage.

By SIR JOHN BOYD ORR
Director-General, FAO of the U.N.

Told in an exclusive Science Service interview

➤ THE generous people of America will be mindful of the needs of others when they come to their traditional turkey dinner on Thanksgiving Day. They will return hearty thanks for the fruits of the earth with which they have been so bountifully blessed, that they may share with those who are in want.

Never before in modern times has there been more desperate want in the world. In other lands, in Europe and Asia and in parts of Latin America and the Near East, few people will have turkey this year, or any festive equivalent of the Thanksgiving fowl of the United States.

Even in countries like England, where a poor man can still get a full meal, there will be no feast, for the best dinner possible for him is seldom anything but drab. If his diet does maintain health, it still lacks variety to support his spirits.

Millions of others must count themselves fortunate to have even enough to stave off starvation. Many will not be able to do even that.

South of the Border

In some of the countries of the Western Hemisphere, in Mexico and Guatemala for example, many people might have festive turkey on their tables, though of course they do not celebrate Thanksgiving Day, a national holiday of the United States of America. But the turkey has been a favorite festive fowl in Central and South America for many centuries. And though living standards in some countries of this region have never been high, shortages this year are not so great as elsewhere in the world.

The turkey went to the Middle East to get its western name. There it is highly favored for a feast; but few will be able to afford this food in the Middle East this year. While supplies of food are not as scarce in that region as in

many others, inflation ranging from 200% to 1,000% above prewar years makes it very difficult for the majority of the people to secure even the necessities of life.

Farther to the East, in India, more than half the people are rice eaters. A feast would be boiled rice, mixed with vegetables and some meat cooked with spices. In better times a poor man might afford such a feast, together with some sweets, once or twice a year. But rice production is only 92% of the prewar level and the population has increased by many millions. Plain rice, and too little to go around, will be the season's fare of the overwhelming majority of the rice eaters of India.

India's Wheat Crop

In other parts of India the people are wheat eaters. The partial failure of the wheat crop and the abandonment of fields of wheat at the harvest season in the Punjab during the period of civil strife last summer will aggravate hunger among the population there and elsewhere in India.

As in India, the people of China are divided among rice eaters and wheat eaters. China is short of food and a serious famine occurred there last year. In the South of China there are shortages of fertilizers, seeds, and farm animals. Many people are too weak from under-nutrition to work. In the North of China the wheat crop this year was cut 60% by the spring drought. All over China communications have been disrupted by years of war and civil unrest. There will be scarcely any feasts among the masses of people of China this year.

As serious a food crisis exists in some countries of Europe as in Asia. Last year in nine European countries, representing one-half of the population of the continent, less than 2200 calories daily per person were available. Nutrition experts have defined as "emergency subsistence" a national average supply level of 2200 calories. This is the minimum needed to prevent serious under-nutrition leading to disease and the

danger of civil unrest.

A low average in a country means semi-starvation for some groups and adverse effect on health generally. The prolonged food crisis in both Europe and Asia has retarded the growth of young people, lowered body weights, and increased the death rate, especially among children. It has impaired the capacity for work and increased the incidence of tuberculosis and deficiency diseases. In some regions of Europe tuberculosis has reached the epidemic stage.

Food Rationing in Austria

The modest goal of the government of Austria last summer was to have stocks of food at least four weeks ahead. Then the government could plan for good distribution to settle unrest among the people. The people realized that they could not have any more food than the ration stipulated. They only wanted to be sure that this meager ration would be honored. Normal consumption was 1550 calories, of which 1,000 came from bread. Beans and sauerkraut sometimes had to be put on the ration for babies because there was nothing else to give.

A "thanksgiving" day dinner in Austria, Poland, or Germany, might be a bowl of potato soup. It might include a few leaves of cabbage.

An FAO nutritionist wrote of con-



FOR AMERICAN THANKSGIVING—Mindful of the misery abroad, we have much to be grateful for when we sit down to our traditional turkey dinner on Thanksgiving Day.



EUROPE'S MEAGER FARE—Sir John Boyd Orr is shown eating bread with a little margarine, some cabbage and potato, illustrating the desperate want that will stalk millions abroad while we feast.

ditions she observed in Italy last summer. The government calculated that the food supply in the country would provide a daily allowance of 2,076 calories per person daily. Since the partial failure of the European harvest last summer, the estimate must now be revised downward. The tuberculosis rate in Italy has risen to almost double the 1940 rate and is of the most serious concern to the government.

What Italians Are Eating

An Italian's ordinary dinner is spaghetti with sauce. His daily allowance of fats and oils is less than a tablespoon, and of sugar one teaspoon. He will have vegetables and fruit in season and a tiny piece of cheese when it is available. Such would be a "thanksgiving" dinner in Italy.

In Scotland, my native land, one may have a shilling's (20 cents) worth of meat a week. A family of three could manage a two-pound roast for Sunday dinner by doing without meat the rest of the week. Food rationing in the United Kingdom is austere but it is democratic. Food supplies are distributed fairly among all the people. Supplies of food available in the United Kingdom in 1946-47 were sufficient to main-

tain an average calorie level of 2,880 per person daily. The average level in the United States was 3,392.

But comparisons of numbers of calories available to people tell only part of the story of the difference between the diet in America and in the deficit countries. Suppose, instead, we compare available supplies of meat and poultry, eggs and milk.

In the United States, supplies available for consumption in 1946-47 were sufficient to provide each member of the population with two average-sized servings of meat and poultry, one egg and three glasses of milk daily.

Amount For Consumption

This quantity of meat and poultry was the amount available for two days' ration in France, four in Britain, $6\frac{1}{2}$ in Italy, and 14 in Poland and Austria. In Poland and Austria three glasses of milk had to last four days and available supplies of eggs were only sufficient to provide one per person every fortnight. This quantity of milk and the egg would have been the average supply available for the ration of these products for six days in Italy and three days in France. The United Kingdom was able to supply an egg to each person every

other day and three glasses of milk for $1\frac{1}{3}$ days.

Cereals constituted 52% of the average European diet in 1946-47, and as much as 62% in countries where the calorie supply was low. In the United States cereals formed only 25% of the diet. Some of the people in a few of the countries of Europe have had practically no animal food since the war.

Owing to partial failure in the 1947 harvest the people in the deficit areas of Europe this year face the threat of even lower rations than any time since the war. Nor will the food shortage end in 1948. It will continue for many years. But it can be overcome, provided the nations will act together on a unified plan. The solutions are to be found in more production and more equitable distribution of food, together with a general improvement in the economic life of the people of the whole world.

Then and only then may a Thanksgiving Day for the world be proclaimed.

Science News Letter, November 22, 1947

Milk is desirable for elderly persons to help prevent bone breakage.

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New Use for Laughing Gas

Mental patients are now being helped by its calming effect. With this treatment the patient gains insight into his trouble through conscious mental processes.

➤ THE use of "laughing gas" to calm excited mental patients and even to help some toward partial recovery from their illness is reported by Drs. H. Lehmann and C. Bos of Montreal in the *American Journal of Psychiatry*, (Sept.).

The gas used is nitrous oxide, which many persons know from taking it when a tooth is pulled. The Montreal doctors give enough of it to the mental patients to get them past the "slap-happy" stage but not to produce a serious degree of oxygen lack.

The treatment is safe, they find. It lasts about two to four minutes. After it the patient wakes up in a much better mood for talking to the doctors and discussing his problems.

This phase of "mental facilitation" was unexpected. It is this which is apparently responsible for the treatment helping the patient toward some degree of recovery, since it makes the patient better able to gain insight into his

trouble and accept psychiatric treatment.

But even apart from this, the treatment helps by calming the patients. The calming effect lasts for several hours, and patients get a good night's sleep after the treatment. It was this calming effect on excited patients for which the doctors first used the treatment.

Some patients are given the treatment as many as four times a day, though for many one treatment a day is enough.

The "laughing gas" treatment is something like electric shock treatment, the doctors believe, but is less severe, safer and easier to give. It differs somewhat also from another modern psychiatric

treatment called narcoanalysis. In this narcoanalysis, drugs are given to put the patient to sleep or in a hypnotic state which makes it possible for him to remember and talk about repressed feelings and experiences. With narcoanalysis, the doctors can get at unconscious factors in the patient's mental illness. With the "laughing gas" treatment, the patient gains insight into his trouble through conscious mental processes.

The doctors are now studying the effects of this gas treatment in patients in the early stages of manic-depressive illness who have not yet had a complete mental breakdown. The speed and ease with which the treatment promotes mental activity and the feeling of well-being and increased confidence it gives may, they think, be valuable at certain stages of psychiatric treatment.

The treatment may be given to patients in the doctor's office without interrupting their ordinary activities.

Science News Letter, November 22, 1947

METEOROLOGY

Greenland Essential Now

➤ AMERICAN weather, radio and airport stations on Greenland, which played an important part in the recent war, are now essential for the peacetime navigation by air or water from the United States to European ports by way of the Great Circle route.

It is the short route to much of Europe. Planes from New York to West Europe pass over Newfoundland, then south of Greenland. Ocean liners follow a parallel route, particularly during the non-iceberg season. Both, on the eastern half of their trip, are subjected to weather bred in Greenland. In fact, all western Europe is affected by Greenland-bred weather.

Greenland is a Danish possession. By treaty with Denmark these essential stations can remain indefinitely under peacetime conditions. Some believe that Greenland should be purchased from its present owner and become property of the United States. The stations would then be secure. Russia is said to object to the American operation of such stations either under treaty or ownership of the island. Hitler objected to them during the war. Weather reports from them assisted the Allied Armies in their invasion of France and Germany. They

also were of great help to the American convoys which carried food and war equipment to the Red Armies by way of Iceland and northern Russian Arctic ports.

Greenland is the largest island in the world, not counting the Australian continent. It is estimated to contain 736,518 square miles of territory, about one-fourth that of the continental United States. But most of Greenland is covered with ice; only about 31,000 square miles, along the southeast and southwest coastlines and south of the Arctic Circle, is free of ice and suitable for settlement. It is along these coasts that most of Greenland's 21,000 people live. Practically 20,000 of these are native Greenlanders.

Economically, Greenland is not important. It produces a few vegetables for home consumption. It has a few cattle, but is growing in importance as a sheep-raising country. It exports considerable cured fish and some whale and seal oil. It has some coal and iron. Its most valuable mineral is cryolite, a mineral found only there and used in the United States in the manufacture of aluminum by the electrolytic process.

Science News Letter, November 22, 1947



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CHILDREN OF THE PEOPLE—Dorothea Leighton and Clyde Kluckhohn—*Harvard Univ. Press*, 277 p., illus., \$4.50. This comprehensive study of Navaho personality and psychology, with its detailed consideration of the manner in which "The People" bring up their children, should be of interest to anthropologists, teachers, psychiatrists, psychologists and educators. It is a joint project of the University of Chicago and the U. S. Office of Indian Affairs.

HEARING AIDS—An Experimental Study of Design Objectives—Hallowell Davis, et al.—*Harvard Univ. Press*, 197 p., paper, \$2.00. Initiated under contract between the Office of Scientific Research and Development and Harvard University, this survey describes the experiments, tests and results upon which an ideal master hearing aid for the majority of deaf should be based.

HIGHWAY RESEARCH BOARD—Proceedings of the Twenty-Sixth Annual Meeting—Roy W. Crum, Fred Burggraf, and William N. Carey, Jr.—*Div. of Engring and Ind. Res., Nat. Res. Council*, 618 p., illus., \$7.50. Report includes papers on economics, finance and administration, design; materials and construction; maintenance; traffic and operations, and soils investigation.

THE LIFE AND WORK OF COPERNICUS THE ASTRONOMER—Angus Armitage—*Schuman*. This book has been chosen as the first of the fall series of Science Service Book Selections. See page 336 for further details.

NATIONAL PAINT DICTIONARY—Jeffrey R. Stewart—*Stewart Research Laboratory*, 3rd ed., 704 p., illus., \$7.50. Detailed definitions, with illustrations, which should be helpful to the paint technologist or the student.

OUR CHILDREN ARE CHEATED—Benjamin Fine—*Holt*, 244 p., \$3.00. The author presents the results of a nation-wide survey

of educational standards in the public school systems, analyzes the problems which constitute a crisis in education, and assesses the importance of this crisis to a democratic society.

PSYCHIATRY FOR EVERYMAN—J. A. C. Brown—*Philosophical Lib.*, 247 p., \$3.00.

NUCLEAR PHYSICS

Soviet Atom-Bomb Test?

➤ ONLY really likely detail in the Armistice Day report of a Soviet atom-bomb test is the locale—Irkutsk. This Siberian city, near the southern end of Lake Baikal, is in the midst of wild inaccessible country that would be just about as good as our own New Mexico desert for the technical purposes of a major explosion test. It would be even better from a security viewpoint, for there is hardly a place in the world that unauthorized visitors would find it harder to reach. The area for hundreds of miles around is completely under the control of the USSR, and transportation, except over the Trans-Siberian Railway, is limited to caravan routes over the Mongolian deserts and through the mountains.

For the rest, the whole business looks like either a deliberately "planted" story timed for maximum political effect to offset the convening of the special session of Congress in this country, or (more likely) the kind of "think-piece" that used to be cooked up by frustrated newspapermen in such wartime rumor factories as Stockholm and Zurich.

The 13-pound weight given for the bomb would be correct only if the critical mass of the U-235 or plutonium used were near the minimum of four and two-fifths pounds first suggested in the Smyth report. Something must be allowed for the weight of the bomb casing—and 13 pounds is just about the weight of a common 75-millimeter shell.

A later, more closely calculated critical weight, from a high British scientific source, puts the minimum between 22 and 66 pounds. This is too high for the reported Soviet bomb.

The 21-mile distance at which the explosion could be heard sounds a lot more like the audible range for a very ordinary missile such as a 1000-pound bomb or a 16-inch naval shell.

Intended for popular use, this book is a well-written history of psychiatry, including exposition of the theories of Freud, Jung, Adler, and others, as well as some discussion of psychiatric techniques.

REFERENCE BOOKS A Brief Guide for Students and Other Users of the Library—Mary Neill Barton—*Enoch Pratt Free Library*, 94 p., illus., paper, 80 cents. A convenient handbook of suggestions to the library user on how to utilize a number of the more popular reference materials.

Science News Letter, November 22, 1947

The Able-day burst at Bikini was a loud though somewhat dull roar at the 19-mile distance at which the observation ships were stationed, had there been anyone at a hundred-mile distance he probably would still have heard it. The first American test, in the Southwestern desert, was reported to be audible 200 miles away.

Nothing is said in the news story by the unidentifiable "John Griggs" about the brighter-than-daylight flash and the fast-climbing incandescent cloud which have been most outstanding features of all four air-bursts of atom bombs thus far authentically reported.

Detection at a distance of any atom-bomb explosion is most likely through very sensitive instruments that record fluctuations in the number of electrically charged particles in the atmosphere. If American scientists with our armed forces have such instruments set on mountain-tops in Japan or the Aleutians they may possibly have picked up invisible but still radiologically active wisps of an atom bomb as far off as Lake Baikal. Detection by instruments of known types on the American mainland is quite improbable. Claims of such detection after the first Bikini explosion are now regarded somewhat skeptically by most American physicists. Of course, if American observers did pick up something in Japan or the Aleutians, the records are not likely to be made public.

The Serge Vavilov who is reported to be heading Soviet atomic research apparently is the same as S. I. Vavilov, who has been president of the Academy of Sciences of the USSR since July, 1946. The Very Rev. Hewlett Johnson, "Red Dean" of Canterbury, in a new book on Soviet Russia, quotes him as promising, in his inaugural address, that "Special attention will be paid to atomic energy and cosmic rays."

Science News Letter, November 22, 1947

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GEOPHYSICS

Radar of Little Value in Finding Mineral Deposits

➤ IN spite of popular belief, radar probably will be of little value in locating hidden minerals in the crust of the earth, the American Mining Congress meeting in El Paso, Texas, was told by Dr. Henry R. Joesting of the U. S. Geological Survey. Microwaves have practically no depth penetration, he said.

Plane-borne radar could be used for rapid mapping of rock outcrops and of variations in soil and vegetation, which are often indicative of deeper-seated conditions. But comparable information can be obtained more simply and more cheaply by ground observation and aerial photographs.

Dr. Joesting described the instruments used by geophysicists in locating underground minerals, and predicted new electrical devices. Geophysics plays a major part in petroleum exploration, he declared, but for other minerals it has not been a spectacular success in this country. The petroleum industry spends annually more than \$50,000,000 in the United States on geophysical exploration and on research in geophysical methods. The amount spent for the same purpose by other mining enterprises is relatively insignificant.

Geophysical exploration techniques have benefited from recent developments in electronics, metallurgy, chemistry and in almost all fields of physical science, but it is doubtful if any entirely new techniques will result from these developments, nor is it likely that basic principles will be radically changed. Lighter, more powerful equipment will result, equipment that will use automatic recording and computing instruments.

The war-developed magnetometer is finding practical application in mineral surveys, he stated. The air-borne instrument, flown over great areas trailing a plane, has a ground version that is used in a car-towed trailer. The helicopter is also being used for detailed magnetic surveys.

An electric method, that offers future promise, involves the induction of current in the ground by a primary alternating current flowing through an insulated coil; and the measurement of the resulting electromagnetic field at the surface by means of a second coil and an amplifier. The method has been little used in America, but is in use in Sweden, Finland and Russia.

Science News Letter, November 22, 1947

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☼ **ASH TRAY**, flower and candle holder in combination, is an elongated tray with a grill cover which has a round hole in its center to support a candle. The stems of flowers are stuck through the rectangular openings in the cover into perforations in a platform below.

Science News Letter, November 22, 1947

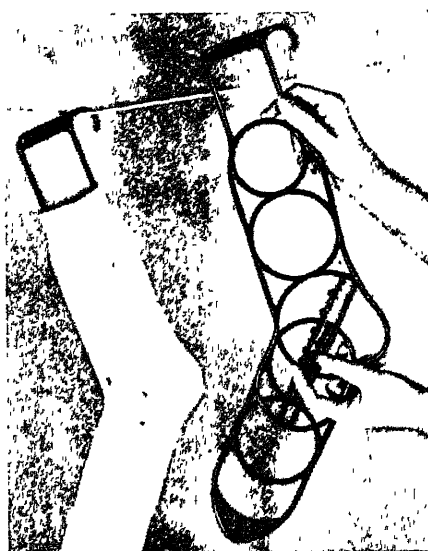
☼ **STAPLES** for low-voltage household electric wiring are held together in strips of ten by an insulating material which fits on the inside of their U-ends. When one staple is driven, the remaining strip with its staples is easily separated by means of perforations in the insulation.

Science News Letter, November 22, 1947

☼ **ELECTRIC HEATER** and battery charger in combination, recently patented, has an electric resistance heating element with terminals to connect to a commercial alternating power line, and also a transformer to change the alternating current to direct current of the proper voltage for battery charging.

Science News Letter, November 22, 1947

☼ **SOCK-STRETCHER**, particularly to prevent shrinkage of wool socks when drying, is made of a flexible plastic frame, shown in the picture, and has an adjustable foot which can be ex-



tended from size 9 to size 13. The adjustment is made with a thumb knob.

Science News Letter, November 22, 1947

☼ **CHEMICAL COATINGS** for artificial fish lures, such as flies, spinners, and miniature crawfish or frogs of rubber that are drawn along the water's surface, have a distinctive odor for the lure on which used. Some fish are guided by smell; the value of these scented lures is now under test.

Science News Letter, November 22, 1947

☼ **BOW-PIN**, for curling hair, is a flattish metal strip used in combination with a plastic tube and an ordinary hairpin. The bow-pin, with ends close together, is inserted into the tube with the hairpin outside through its loop. When the hair is wound around the tube and the tube pulled out, the bow-pin snaps down to hold the curl in place.

Science News Letter, November 22, 1947

☼ **LAMP TO KILL GERMS** in the air by indirect radiation, and molds and fungi on surfaces or in liquids by direct radiation, will find uses in homes and schools to destroy airborne bacteria, and wide uses in food-processing plants and other places to destroy contaminating germs and fungi.

Science News Letter, November 22, 1947

★ SCIENCE SERVICE BOOK SELECTION

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by Angus Armitage

An illuminating account of the life of Copernicus, astronomer of many talents. It was he who, in the sixteenth century, rejected the traditional view that the earth was a fixed point in space and constituted the center of the universe, around which circled the sun and stars. This revolution in man's conception of the universe is presented in its historical setting, against a background of conflicting beliefs about the world. Astronomy as envisioned before the time of Copernicus, his own life and contribution to scientific thought, and the ultimate acceptance of his work as furthered by men who followed him, all are described with vividness and clarity. illus 210 p \$3.00.

This book is one of those chosen from time to time by Science Service for the convenience of its readers, as an outstanding work in its field.

Question Box

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Photographs: Cover, Westinghouse; p. 325, left, Chemical and Engineering News, p. 325, Navy; p. 327, General Electric Co.; p. 330 and 331, Fremont Davis.



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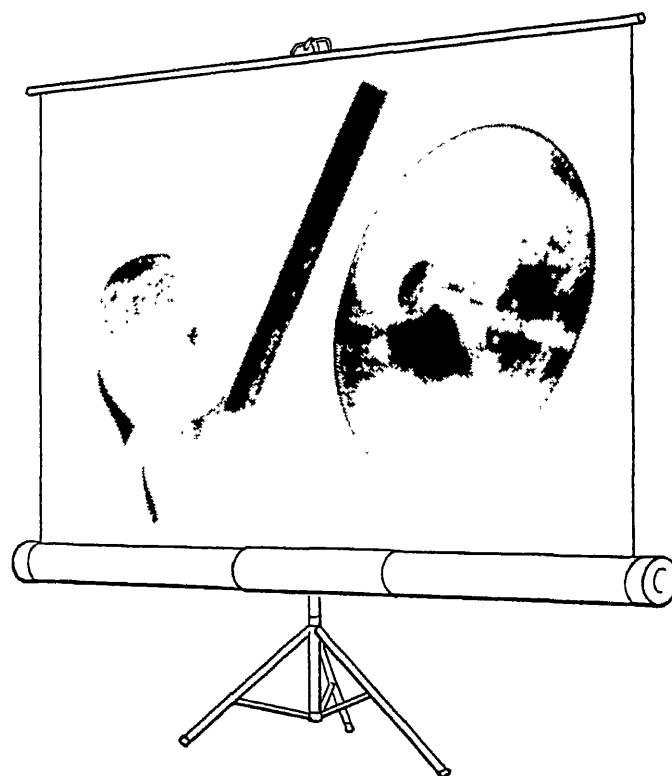
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SCIENCE NEWS LETTER



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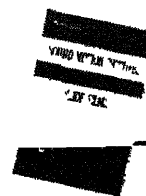
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PSYCHOLOGY

Nose Smells by Radiation

Newest theory denies that smell is a chemical sense. Experiments show that you are conscious of odor because your nose radiates heat waves.

See Front Cover

➤ YOU smell a rose, a broiling beefsteak or your girl's favorite perfume because your nose is a radiator. It sends off heat waves. The reason that you can smell some things while others seem to have no odor is because only certain substances are "tuned in" on your wavelength.

This is the newest theory of how you smell, presented to the National Academy of Sciences by Prof. Walter R. Miles and Dr. Lloyd H. Beck, both of Yale University. They tested their theory by watching the behavior of bees clustered around honey.

The new theory tosses out the window all present-day teaching about smell. According to these scientists, you don't smell because vapor charged with aromatic particles hits your nose and goes into solution on its moist inside lining. Smell is not a chemical sense.

Things are quite the other way. All that the rose or the beefsteak does is to let escape a gas capable of absorbing radiation of certain wavelengths—exactly the band broadcast by your nose. It is the resulting loss of heat from your olfactory sense organ followed by a speed-up of radiation that your brain interprets as a smell.

This is comparable, Dr. Miles says, with the manner in which you feel cold. When you touch, or are near, a cold object like a cake of melting ice, the object absorbs some of the heat from your body. It is the heat loss from your body, not the cold of the object that causes your sensation of chilliness.

The radiation sent out by your smell organs is within the infra-red band of the spectrum—that is, it consists of heat waves, the psychologists reported. And they are in the neighborhood equivalent to a temperature range from 62.6 degrees to 104 degrees Fahrenheit.

The smell receptors in your nose, which probably now should more properly be called "broadcasters," have the same size as the wavelengths in this band, 8 to 14 microns. They differ from one another in both size and shape and because of these differences they radiate

waves of different kinds. It is this differential radiation that makes it possible for you to know the difference between a rose and a beefsteak or between a good egg and a bad one.

Evidence to confirm their theory was obtained by the scientists in experiments with bees. Honey was inclosed in each of two cast-iron boxes. In the end of each was a window. The two windows looked alike, were of the same color, but one let the infra-red rays through and the other did not.

In order to interest the bees in the experiment, a few drops (exactly the same amount) of honey was put on a platform in front of each window. Before the experiment, this honey was removed. Then the bees clustered around the infra-red-passing window in proportions as high as ten to one.

Drs. Miles and Beck are shown on this week's cover of the SCIENCE NEWS LETTER, examining a block of thallium bromo-iodide, used in the window.

In a similar experiment with roaches, 24% of the insects wiggled their antennae when oil of cloves was released behind the infra-red-passing window, 26% when the oil was in the room with the insects but only 15% when no odor was present. Antennae are to the insect what the nose is to humans.

Dr. Miles credits Dr. Beck with having worked out the revolutionary theory. Dr. Miles planned the psychological experiments designed to test it. Only the experiments on insects were reported at this meeting, although research is also being conducted on animals and man.

Science News Letter, November 29, 1947

ASTRONOMY

New Japanese Comet Found In Southern Heavens

➤ A BRIGHT new comet has been found by a Japanese star-enthusiast. Of the ninth magnitude, just faintly visible with good binoculars, it was spotted in the southern constellation of Hydra, the water monster, on Nov. 14. It will be called Comet Honda after its discoverer, according to the Tokyo Observatory. The tailless comet is heading southeast.

Word of the comet was cabled by the Supreme Command, Asiatic Pacific, Tokyo, to Harvard College Observatory.

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BEES AROUND FILTER—The window at the left is of thallium bromo-iodide which passes infra-red rays. The one at the right stops the radiation. Honey is behind both windows but no chemical from it can get out to the bees. Notice how the insects cluster around the infra-red passing window. The box is made of old seasoned wood which has no distinctive odor.

BIOLOGY-NUCLEAR PHYSICS

Life Goes on at Bikini

Seemingly ignoring the atomic-bomb explosions, animal reproduction is as usual, no monsters having been born. Neither plants nor animals show traces of experience.

➤ *LIFE* on the islands and reefs of Bikini, and in the lagoon where the wrecked ships lie, goes on practically as if no atom-bombs had ever been built. Slight amounts of radioactivity are detectable occasionally in fishes and other aquatic organisms, but there seem to be no large-scale differences in either the fixed animals on the reefs or in the swimming life in the water, declared Comdr. Roger Revelle, USNR, who led a four-ship expedition to the twice-blasted atoll last summer, before the meeting of the National Academy of Sciences.

The only difference found, aside from some outright destruction of a few coral patches, was a rather obscure one in some of the organisms: a higher activity of one of the respiratory enzymes, catalase. No monsters have been born or hatched, and animal reproduction goes on as usual. No land plants or animals showed any trace of their atomic experience.

Bikini seems perfectly ready to forget all about it.

Growth from Cell Center

➤ *PINCHING* nerve fibers demonstrates that growth activities in cells begin at their centers and proceed outwards, Dr. Paul Weiss of the University of Chicago told the meeting. Nerve fibers, no mat-

ter how long, are simply extensions of the cells to which they belong. When such a fiber is compressed, living substance piles up at the obstruction and makes a noticeable bulge. When the constriction is removed, the bulge moves on out towards the end of the fiber. Dr. Weiss suggested therefore that "the basic protoplasmic systems of the cell, particularly native proteins, cannot be synthesized in the cytoplasm, but must be supplied from a nuclear source."

Academicians Meet Panchito

➤ "PANCHITO", or Tepexpan Man, the 10,000- to 15,000-year-old skeleton found recently in Mexico, was five feet seven inches tall, Dr. Javier Romero of the Mexican National Museum and Dr. T. D. Stewart of the U. S. National Museum concluded as a result of their months of study on the now famous remains. Their computations, based on long-bone measurements, make this very early American somewhat taller than the average Mexican of today.

A restoration of Panchito's features, built over the carefully replaced bones of his nearly complete skull, shows him a typical Indian. He has a cranial capacity of 1540 cubic centimeters, which compares quite favorably with that of modern men.

Science News Letter, November 29, 1947

PSYCHOLOGY

Tap Electricity on Eye

➤ *WHEN* a flash of light enters your eye, it produces an electric response on the eye's retina itself.

How scientists worked out a means for tapping this electric current on the eye itself and measuring it was reported to the National Academy of Sciences by Dr. Lorrin A. Riggs, psychologist of Brown University. The record of the eye's electric potential, he told the scientists, can be used to measure the eye's visual sensitivity.

A silver disk, inserted in a contact lens, was used to hold one electrode in

close and constant contact with the cornea of the eye. The other electrode of the pair was located in another place on the head of the subject. A flash of light was found to cause a momentary increase in the potential of the eye electrode. The jumps in potential were then recorded in a photographic record.

Dr. Riggs is sure as a result of his experiments that the electrical response originates in the retina or sensitive layer of the eye itself, he told the meeting, although so far it is not known exactly what happens to produce it.

It is the eye's system of night vision that is responsible for the electrical response, Dr. Riggs found. As your eyes become more and more used to darkness, they get more sensitive until they are finally a thousand times as sensitive to light as is your daylight vision. This increase in sensitiveness, Dr. Riggs found, is accompanied by a parallel increase in electrical response.

This method of tapping the electric currents on the eye gives scientists for the first time a method of finding out what goes on in the eye itself uncomplicated by what happens in the brain's visual centers. It also gives a measure of what the eye can see without having to depend on what the person tested says he sees.

Science News Letter, November 29, 1947

SCIENCE NEWS LETTER

Vol. 52 NOVEMBER 29, 1947 No. 22

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5 00 a year; two years, \$8 00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5556, and 360 N. Michigan Ave., Chicago, State 4439.

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ASTRONOMY

Birth of Cosmic Rays

New theory suggests they may originate close to the earth where radiations from the sun strike local clouds of cosmic dust.

► SHOWERS of cosmic rays may be born close to the earth where radiations from the sun strike local clouds of cosmic dust, the stuff from which meteors are made. This theory, making cosmic rays a local phenomenon, was presented by Dr. Donald H. Menzel of Harvard College Observatory at the meeting of the National Academy of Sciences.

Cosmic-ray showers are created out of local clouds of ions found in space within a few million miles of the earth. Long-wave radiations from the sun give these ions energies as great as 100,000,000,000 volts. The neutron component of the cosmic rays comes from the splitting of heavier atoms into neutron-proton constituents as cosmic rays encounter the earth's atmosphere, Dr. Menzel said.

Thus cosmic rays come in groups

rather than one or two at a time, the studies of Dr. Menzel and Winfield W. Salisbury indicate. Their research offers a theory that not only interests cosmic ray experts, but offers a good working theory that may also aid study of the ionosphere, radio-echoing layer of atmosphere surrounding the earth.

Fluctuations of the sun, associated with the gustiness and turbulence of the solar atmosphere, cause radio noises of very low frequencies that are sometimes heard here on earth. Because of their long wavelengths, these radiations can escape from the sun, especially in regions where magnetic fields reduce the conductivity. The energy is also known to penetrate the ionosphere.

The radio waves responsible for the cosmic rays also produce other effects,

the Harvard astronomer pointed out. They cause appreciable heating of the solar atmosphere, and lead to the million-degree temperature of the solar corona. The emission exerts a cooling action on sunspots. The light of the night sky and aurora borealis are electrodeless discharges in the electric field of the radiation. Other effects include certain types of ionospheric disturbances and the existence of a potential gradient in the earth's atmosphere.

Science News Letter, November 29, 1947

ICHTHYOLOGY

Submerged Lights Lure Fish into New Jap Net

► ACUTE food needs in Japan are responsible for the newest thing in commercial fishing: the use of a string of submerged electric lights to lure fish into a trap or pound net. It makes possible several hauls per night, instead of the single haul that could be made by the old traditional method, of which it is a modernized modification.

In the old fixed-net method, a pair of great, fence-like nets, each from 200 to 500 feet or more in length, are set at an angle to the shore. At their junction is a trap net, into which they lead the fish. These long wing nets are of course very costly and require a lot of hard labor in setting.

In the new method, the wing nets are dispensed with. In their place, a long line of 300- or 400-watt electric lamps is strung out from the shore to the trap net. The lamps are kept about 10 feet under the water and are spaced about 60 feet apart. Each lamp illuminates a water area from 175 to 200 feet in diameter.

After dark, the lamps are all turned on, and each of course attracts its school of fish. After about two hours, the lamp nearest shore is extinguished, and its fish immediately desert it for the next bright spot down the line. After two minutes, this lamp is also turned off, and the performance is repeated until only one lamp is left lighted—inside the trap net. Then the fishermen pull the mouth of this net shut and haul in the fish.

The new fishing method was developed for the Ministry of Agriculture and Forestry by the Nishina Laboratory of the Institute for Physical and Chemical Research. Tests were conducted at the Marine Experimental Station on the beach at Sumoto in the Hyogo prefecture.

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CONFER—The four contributors to the symposium on protein structure at the fall meeting of the National Academy of Sciences are examining models of protein molecules. They are left to right: Dr. John L. Oncley, Harvard Medical School, Dr. Alexander Rothen, Rockefeller Institute for Medical Research, Dr. David Harker, General Electric Co., and Dr. Robert B. Woodward, Harvard University.

PSYCHOLOGY

50% of Men Ignore Vows

Marital infidelity varies in frequency with age and social level. It occurs most frequently among urban males and less frequently among those in the rural area.

➤ MORE than one-third and probably one-half of American married men are unfaithful to their wives at some time in their married lives.

This is one of the findings about the sex life of American boys and men obtained in a nine-year study by Dr. Alfred C. Kinsey and associates of Indiana University.

Confidential case histories of 12,000 persons from every social level and several racial groups were obtained in interviews by Dr. Kinsey and his staff. A report on the facts learned from 5,300 white males will be published Jan. 5 in a book, *Sexual Behavior in the Human Male*, by Dr. Kinsey, Wardell B. Pomeroy and Clyde E. Martin (W. B. Saunders Company).

100,000 to be Studied

The study, supported largely by funds from the Rockefeller Foundation administered by the National Research Council, will be extended, Dr. Kinsey hopes, to include 100,000 persons. Women and girls are included in the study. The findings on them will be published later. Object of the study is to get scientific facts about sex, completely divorced from moral or social interpretations.

The figures on marital infidelity, although higher than any previously published, may not be entirely accurate, Dr. Kinsey admits. Even his highly developed technique for interviewing and winning the confidence of the persons questioned could not overcome the fear many men had about admitting unfaithfulness.

"The most striking thing about the occurrence of extramarital intercourse," Dr. Kinsey states, "is the fact that the highest incidences for the lower social levels occur at the younger ages, and that the number of persons involved steadily decreases with advancing age. Lower-level males who were married in the late teens have given a record of extra-marital intercourse in 45% of the cases, whereas not more than 27% is actively involved by age 40 and not more than 19% by age 50.

"In striking contrast, the lowest incidences of extra-marital intercourse

among males of the college level are to be found in the youngest age groups, where not more than 15% to 20% are involved, and the incidence increases steadily until about 27% is having extra-marital relations by age 50."

The actual figures obtained in the study show 27% to 37% of married males in each of the five-year age periods admitting to some experience in extra-marital intercourse. Allowing for the cover-up by some who feared to give honest answers on this question, Dr. Kinsey believes "it is probably safe to suggest that about half of all married males have intercourse with women other than their wives at some time while they are married."

"For most males extra-marital intercourse is usually sporadic, occurring on an occasion or two with this female, a few times with the next partner, not happening again for some months or a year or two, but then occurring several times on every night for a week or even for a month or more, after which that particular affair is abruptly stopped."

Most of the extra-marital activities are had with companions, prostitutes supplying only 8% to 15%.

More Frequent in Urban Areas

Extra-marital intercourse occurs most frequently among males living in cities or towns, less frequently in rural populations.

"To judge from those few groups on which religious data are available, extra-marital intercourse seems to occur much more frequently among those who are less actively concerned with the church, and much less frequently among males who are devoutly religious," Dr. Kinsey reports.

"The differences between devout and inactive members of any religious group, however, are nowhere near so great as the differences between social levels."

How the husband's unfaithfulness affects the marriage seems also to be different in different social levels. More data and analysis of them are needed, Dr. Kinsey says, for evaluating the social significance of extra-marital intercourse, but he offers the following "fragments"

bearing on the subject:

"At lower social levels, where the most extra-marital intercourse occurs, wives rather generally expect their husbands to 'step out' and some of them rather frankly admit they do not object provided they do not learn of the specific affairs which are carried on. Nevertheless, extra-marital intercourse is the sexual factor which is most often involved in marital discord at that level."

"Extra-marital intercourse is less often accepted in middle class groups. While it may not involve as much quarreling and fighting it often leads to divorce."

"The extra-marital intercourse of the upper social level much less often causes difficulty, because it is usually unknown to anyone except the two persons immediately involved."

Youth No Wilder

"In general, the sexual patterns of the younger generation are so nearly identical with the sexual patterns of the older generation in regard to so many types of sexual activity that there seems to be no sound basis for the widespread opinion that the younger generation has become more active in its socio-sexual contacts," he declares.

"The only instances in which a larger number of the younger generation is involved at an earlier age apply to such activities (petting, for one), as are not ordinarily considered when the charge is made that the younger generation is becoming increasingly immoral. The charge more often concerns pre-marital intercourse with companions and with prostitutes, and homosexual contacts."

On all of these latter points, the records for the older and the younger generations are so nearly identical that no significant differences can be found. Nor could Dr. Kinsey and his staff find any evidence that a larger number of the younger generation are involved in homosexual activities.

"Thirty years ago, petting involved fewer persons and was a less highly elaborated activity than it often is today," Dr. Kinsey found.

Among men who reach the college level, about 87% of the older generation was involved. Today, nearly 95% has had such experience. Among men who never go beyond grade school, only 78% of the older generation had any petting experience, contrasted with 94% in the present day.

The frequencies of petting activities reach their height between the ages of 21 and 25, the study showed.

Science News Letter, November 28, 1947

ASTRONOMY

Universe Is Not Uniform

Research on variable stars emphasizes this as they periodically lose and regain their brilliance within a few days or weeks.

➤ PECULIAR differences in basic physical operation among systems of billions of stars like the Milky Way system of which the earth is a part are emphasized by current research on stars that within a few days or weeks periodically lose and regain their brilliance.

Dr. Harlow Shapley, director of Harvard College Observatory, told those attending the meeting of the American Philosophical Society in Philadelphia of the studies he and Mrs. Virginia McKibben Nail have recently made of Cepheid variable stars in the Large and Small Clouds of Magellan. Forty-nine new graphs showing periodic changes in light as recorded on photographs were presented.

The Magellanic Clouds, looking like detached portions of the Milky Way, are too far south to be seen by observers in the United States. They form, however, our nearest neighbor galaxy.

"The importance of these and similar results lies in their indication of cosmic non-uniformity, either in the distribution of the original chemical elements out of which stars are formed, or in the hydrodynamical operations of a pulsing star depending on position in space or environment," Dr. Shapley stated.

The Large Cloud appears to follow our own galaxy's pattern in the distribution of period lengths of its Cepheids. There are periods of all values from about two days to 100 days, with most of them reaching maximum about every four days. In the Small Cloud, which is only about 190 million billion miles away from the Large Cloud (a small distance, astronomically speaking), and similarly irregular in form, the most frequent period length is less than two days. Most of the periods of Cepheids in the Small Cloud, in fact, have a period that is almost completely avoided by Cepheids in the Large Cloud.

Some additional results are now reported that again emphasize deviations from the conveniently assumed large-scale uniformity of the laws and operations of nature throughout the universe. In the Magellanic Clouds, Cepheids with periods of about eight days have single maxima; in the Milky Way system many Cepheids with the same period have two maxima close together. But in the Clouds those with periods from nine to eleven days mostly have double maxima, although in that interval the Milky Way Cepheids have single maxima.

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At the same time the milling industry and Wallace and Tiernan Company, which supplies most of the nitrogen trichloride for agenzized flour, immediately announced they would discontinue use of the chemical if it had any harmful effect on humans. Wallace and Tiernan Company, in addition, asked Prof. C. A. Elvehjem and associates at the University of Wisconsin, to make an independent investigation of the subject. Army scientists, under the direction of Capt. Maurice L. Silver, also investigated the problem. Finally, the Food and Drug Commissioner asked for opinions from the nation's outstanding food and nutrition authorities.

The answer, from all these sources, is that so far no damaging effect from the agenzized flour has been found in humans. Prof. Elvehjem's group fed it to humans in amounts and for periods of time which would unfailingly produce hysteria in dogs. No symptoms and no changes in brain waves were found. The brain wave studies were made because the disease in dogs takes the form of fits or convulsions such as, in humans, might show brain wave changes.

Meanwhile, with the idea that harm might come to humans eating agenzized flour over a lifetime, the milling and chemical industries are vigorously seeking a substitute for nitrogen trichloride.

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GENERAL SCIENCE

Honors Go to Two Men for Original Scientific Work

➤ FOR original contributions to the field of science a physicist and a geneticist were honored with gold medals at a dinner given by the National Academy of Sciences in Washington.

Dr. Karl Taylor Compton was awarded the Marcellus Hartley Medal "for his long and valuable career in the field of education and of university administration, and in recognition of his eminent service (as Chief of the Office of Field Service of the Office of Scientific Research and Development) in the wartime research effort of the Nation, and in the reinforcing of collaboration and understanding between civilian scientists and military men."

Presentation of the Daniel Giraud Elliot Medal for 1945 was made to Prof. Sewall Wright who has developed the modern mathematical theory of biological evolution.

Science News Letter, November 29, 1947

PUBLIC HEALTH

Disease Threat Averted

➤ THIS is a story of fast action, by government, industry and medical scientists, against a disease and hunger threat. Part of the story comes from Dr. P. B. Dunbar, U. S. Commissioner of Foods and Drugs, and part is told in medical reports and an editorial in the *Journal of the American Medical Association* (Nov. 22).

The disease threat was that humans might be poisoned by a chemical used to treat flour from certain kinds of wheat so as to make better bread. The hunger threat was that the wheat which needed this treatment might have to be removed from the market at a time when every grain of wheat is desperately needed.

It started last winter when a distinguished English nutritionist, Sir Edward Mellanby, reported that "running fits," or "canine hysteria," was produced in dogs by feeding them flour treated with nitrogen trichloride. This chemical has been widely used for the past 25 years to age flour so it will make better bread. The treated flour is called "agenzized."

No hint of any damage to humans from this flour has come in all the 25 years that it has been used. But immediately after hearing of the English findings, our Food and Drug Administration scientists started tests. They found the English scientist was correct.

PHYSICS

Ordinary Light Speeds Up Spinning of Tiny Tops

► ORDINARY light can speed up the spinning of tiny tops.

The "tops" are tiny rotors, suspended magnetically in a vacuum, at the Rouss Physical Laboratory of the University of Virginia by Dr. J. W. Beams. Dr. Beams has speeded up the spinning of the rotors by light from a 100-watt concentrated arc-type lamp, focused by a large short focus lens with a mirror on the surface of the rotor. The light was applied in opposite directions on opposite sides of the rotor.

If sunlight were used, it should be possible to drive the rotors at such a high speed they would explode, the scientist believes.

Pressure from the light is what powers the tiny rotors, less than one-fifteenth of an inch in diameter. Light has pressure but it is a very small amount. Low pressure is used in the experiments to overcome friction. This is an adaptation of the little spinning device run by light which can be seen in optical store windows.

Dr. Beams suggests in a report to the *Physical Review* (Nov. 15) that it may be possible to obtain precise measurements of the pressure and angular momentum of light with this type of experiment.

Science News Letter, November 29, 1947

PHYSICS

Goals of Pure Science Suffer in Large Projects

► DECLARING that men of science are motivated by spirit, a scientist accepting an award for his leadership in the development of the wartime proximity fuze and other achievements charged that today's large programs of technological development are creating a "risky and unbalanced" situation.

Dr. Merle A. Tuve, head of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, warned against large projects in which scientists "are losing sight of the higher goals and values of pure science."

The scientist made an address accepting a \$2,500 Research Corporation Award for pioneering in exploration of the ionosphere and for his role in the development of the proximity fuze. Dr. Joseph W. Barker, president of Research Corporation, made the presentation at a dinner, presided over by Dr. Vannevar

Bush, president of Carnegie Institution of Washington and a previous winner of the award.

Emphasizing that creative research is done by small, independent groups, Dr. Tuve said that "any one group larger than six or seven men will primarily turn its activities into development work."

Current programs of vast sums of money and many men may give more control of science to "people who do not understand the spirit or the methods of science," he cautioned. Another danger is sacrificing the character and spirit of men of science, he added.

"A great many of the large operations which are being publicized as scientific activities today," Dr. Tuve asserted, "are directed toward objectives which are not related to the true nature of science."

"We need much clearer public distinctions in these matters, or science will be charged with the goals and selfish objectives which are impressed on technology for political and economic reasons and which have nothing in common with those of science," Dr. Tuve urged.

Instead of more acceleration in science, the scientist said we need more understanding of human relationships.

"The great need of today," he concluded, "is for the leadership of the humanities."

The scientist who headed the wartime laboratory where major radar developments were made was given another \$2,500 annual award.

The scientist is Dr. Lee A. DuBridge, president of the California Institute of Technology. During the war, Dr. DuBridge headed the Radiation Laboratory of the Office of Scientific Research and Development at Cambridge, Mass. This laboratory did important work on radar.

In making the award to Dr. DuBridge, Dr. Joseph W. Barker, president of the Research Corporation, called the radar scientist "a great research man and leader of what may well have been the greatest research team ever assembled for a specific project."

Two other special awards of \$1,000 have been made this year by the Research Corporation to physics teachers in small colleges whose students have made an outstanding record in advanced work. The teachers who have received the award are Dr. A. A. Knowlton of Reed College, Portland, Ore., and Dr. Clifford N. Wall of the University of Minnesota, formerly at North Central College, Naperville, Ill.

Science News Letter, November 29, 1947



GENERAL SCIENCE

India Is Split Politically But Scientists Are United

► WHILE India is now divided into two parts politically, the scientists of that area are continuing to work together and the principal science organizations there will continue to unite all scientists whether Hindu or Moslem.

This message was brought to UNESCO meeting in Mexico City by the principal scientist in India's united delegation, Prof. H. J. Bhabha, cosmic ray authority from Bombay.

The important Indian Science Congress will continue as it has been constituted, coordinating science in all parts of the Indian nations. The newly organized Indian Association of Scientific Workers will likewise not be split. Dr. Bhabha reported that some Moslem scientists, such as Dr. R. Siddiqui, director of national chemical laboratories, will continue to work in Hindu territory. Dr. Nazir Ahmed, director of scientific development for Pakistan, will be one of the principal advisers to the scientific activity of Hindu area.

Science News Letter, November 29, 1947

MEDICINE

New Chemical Prolongs Penicillin's Stay in Blood

► PATIENTS with the heart disease, subacute bacterial endocarditis, have a better chance of being cured, thanks to a new chemical that keeps penicillin in their blood longer. The chemical is called caronamide and was developed by Dr. K. H. Beyer, of Sharp and Dohme.

Its effectiveness in keeping high levels of penicillin in the blood of patients where excessively high levels are necessary for cure is reported by Drs. Leo Loewe, Harold B. Eiber and Erna Altme-Werber, of the Jewish Hospital, Brooklyn, in *Science* (Nov. 21).

Besides enhancing the curative possibilities of penicillin for these patients, caronamide helps to conserve the consumption of the mold chemical, thereby lessening the cost of treatment. In cases requiring such huge amounts of penicillin, this is a matter of some importance.

Science News Letter, November 29, 1947



NUTRITION

Frozen Sandwiches Give Lunch Boxes More Variety

➤ THE ten o'clock scholar who forgot his lunch may soon be replaced by the one who forgot to put it out to thaw

Dr. Faith Fenton, who has been conducting research on frozen foods at Cornell University, has found that a package of two half sandwiches will thaw at room temperature in from three to three and a half hours. This means that it will thaw in time for Junior's, or his dad's, lunch.

Frozen sandwiches for school lunch boxes will mean less work for mothers and more variety for the children, Dr. Fenton predicts. Instead of fixing lunch along with breakfast each school day, mother can use mass production to turn out several weeks' sandwiches at one time.

"You don't have to finish one jar of sandwich filler before you start another—freeze it in the sandwiches," points out Dr. Fenton.

Sandwich fillings suitable for freezing include cheddar and cream cheese, sliced and ground meat and poultry, fish and cooked egg yolk. Greens in sandwiches will not freeze well, so lettuce, celery or other greens should be freshly packed with the lunch. Mayonnaise should be left out of frozen sandwiches, too. It separates and soaks into the bread when frozen.

If the school child forgets to thaw his lunch in time, the process can be speeded by exposing the frozen sandwiches to the breeze of an electric fan.

Science News Letter, November 29, 1947

PSYCHOLOGY

Tests Reveal What Kind of Adult a Baby Will Become

➤ A LITTLE BABY in his crib, long before he can walk and talk, can be given psychological tests that will reveal how he will grow up.

After only one or two examinations of the infant, a trained expert can tell whether he is suitable for adoption and even give him a rating of "favorable," "highly favorable," or "unfavorable,"

Dr. Arnold Gesell, director of the clinic of child development, Yale University, told the National Academy of Sciences at a meeting in Washington.

If a baseball fan father wants to know whether his son is going to grow up to be a southpaw, Dr. Gesell can tell him the answer before the baby is three months old. All babies during their first few months tend to lie with the head turned to one side and one arm turned in the same direction. A strong preference for the left side shows that the baby will later be left handed, Dr. Gesell said.

During the baby's first year it is possible to detect nearly all cases of idiocy, of brain injury, defects of the senses or motor defects, and serious personality abnormalities, he told the scientists.

Various kinds of giftedness and temperamental qualities can be observed before the child is old enough to go to school.

Science News Letter, November 29, 1947

GENERAL SCIENCE

Logger Wills Estate To National Science Fund

➤ A FRENCH-BORN logger, who lost his life in a logging accident in Multnomah County, Oregon, Sept. 23, has willed his estate to American science.

Dr. Harlow Shapley, director of the Harvard College Observatory and chairman of the National Academy of Sciences' national science fund, revealed the bequest at the meeting of the Academy. During a session devoted to scientific papers on protein structure, the Harvard astronomer interjected a strange but welcome document: the last will and testament of Jules Pradel.

The estate, valued at more than \$16,000, was left to the national science fund. With news of the gift to science came a few sparse details about the little-known benefactor.

Born in France, Jules Pradel was brought to this country when he was four years old, a communication from the First National Bank of Portland, Ore., disclosed. Pradel traveled throughout the world and was naturalized as an American citizen in 1942. Explanation of the contribution to science is believed to be that his mother suffered from a neurosis.

Jules Pradel's savings will be used to subsidize scientific research under the program of the science fund, Dr. Shapley said.

Science News Letter, November 29, 1947

ENGINEERING-AERONAUTICS

Gas Turbine Engines Made Suitable for Small Planes

➤ NEW developments in gas-turbine and jet propulsion of aircraft recently revealed in London include the Rolls-Royce Dart, claimed to be the first propeller-jet engine of small power to fly; the Napier Naiad, one of the smallest gas turbines in the world; and a jet-propelled fighter capable of over 600 miles an hour.

The Dart, a gas turbine driving a propeller, is intended for use in aircraft such as military trainers, but is regarded as an ideal engine for middle-sized planes of the privately-owned class. It is rated at 1,000 horsepower.

The Napier engine is arranged to drive a rotary propeller and also to give jet-propulsion from its exhaust gases. It is an axial-flow type of engine, 28 inches in diameter and eight and one-half feet long. It weighs 1,095 pounds and generates 1,500 horsepower, using kerosene as a fuel.

The new jet-propulsion fighter has already made its first flight. Still on the secret list, it is known only by the designation N7/46. It is expected to furnish the British Navy with a craft superior to anything of its type in the world. It will be built in two versions; one to be land-based and the other to operate from aircraft carriers. It is powered with a Rolls-Royce Nene turbo-jet engine which develops a thrust of 5,000 pounds.

Science News Letter, November 29, 1947

MEDICINE

Penicillin's Cousin Is Found Good for the Itch

➤ TYROTHRIN, one of penicillin's cousins among the new antibiotic remedies, has now been used successfully to treat scabies, or the itch, in cases complicated by a secondary infection with pus formation.

Within two weeks active sores disappeared in 69 out of 71 cases, Drs. Harry M. Robinson and Harry M. Robinson, Jr., of the University of Maryland School of Medicine, reported at the meeting of the Southern Medical Association.

The tyrothrin, which is an anti-germ chemical from a soil bacillus, was used in a mixture with benzyl benzoate, standard scabies remedy. Only one moderately severe reaction to the tyrothrin occurred.

Science News Letter, November 29, 1947

ASTRONOMY

Bright Stars in Winter Skies

The most brilliant is Sirius, the dog-star, of the constellation of Canis Major. No naked eye planet remains visible during the evening.

By JAMES STOKLEY

► TO SEE any planets during December you must look either early or late in the evening. As during the past month, no naked eye planet remains visible during the whole of the evening, and once again no planet appears on the accompanying maps. These show the heavens as seen from the latitude of the United States about 10:00 p.m. (your own kind of standard time) at the beginning of December, 9:00 p.m. on the 15th and 8:00 p.m. at its close.

Brightest of the stars shown is Sirius, the dog-star, of the constellation of Canis Major, the great dog. This stands low in the southeast and is one of the brilliant group of constellations that make the stars of the winter evenings so conspicuous. Directly above Sirius is the most familiar of all—Orion, the warrior, with the three stars in a row that mark his belt, according to the pictures on the old star maps. Above the belt is Betelgeuse and below it is Rigel.

Among the Higher Stars

Still higher is Taurus, the bull, with first-magnitude Aldebaran. Next to this group—to the left—is Auriga, the charioteer, in which Capella shines. Below him we find the twins, Gemini, with Castor and Pollux. The latter star ranks as first magnitude, but the former is a little fainter. And between Gemini and Canis Major there is Canis Minor, the lesser dog, with the star Procyon.

Looking toward other parts of the sky we see Cygnus, the swan, low in the northwest. The star Deneb is at the top of a part of this constellation known as the northern cross. Nearby, close to the horizon as seen on the maps, is Vega, in Lyra, the lyre. In the early evening, at the beginning of December, these figures are much higher and seen to better advantage. At 8:00 p.m. on Dec. 1, for instance, the heavens appear as they were shown on November maps.

High in the west, resting on one corner, is the great square, in the con-

stellation of Pegasus, the winged horse. Extending higher from the uppermost star in the square is Andromeda, the chained princess. In this, on a dark clear night, you can see a hazy spot of light which is the great galaxy in Andromeda. This is another star system like that which makes up our whole Milky Way, and of which the sun is part, but at a distance of about 800,000 light years. That is, travelling 186,000 miles every second, the light from this vast swarm of stars takes 800,000 years to reach us

Venus at Sunset

Coming now to the planets, which are dark bodies like the earth, revolving about the sun, we can see Venus low in the southwest just after sunset. A morning star, visible before sunrise during the earlier part of the year, it has swung to the other side of the sun, and is now an evening star. During the coming months it will set later and later, continually increasing in brightness until it reaches its maximum on May 18.

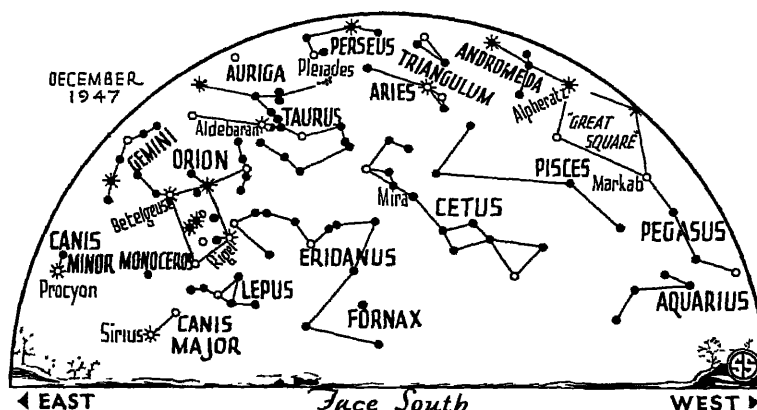
Mercury and Jupiter this month are both too near the sun to be seen, but a little before midnight Mars and Saturn appear above the eastern horizon in the constellation of Leo, the lion. At the beginning of December, Mars is seen very close to the star Regulus, though it is about 90% brighter, while

Saturn is about three degrees (or six times the apparent diameter of the full moon) toward the west. Its position changes very slowly, but Mars is moving eastward. At the middle of the month Regulus just about bisects the line between them. On Dec. 1 the two planets are about the same brightness, but both are now increasing. However, the increase of Mars is more rapid. By Dec. 31 it is about 50% brighter than Saturn—and three and a third times as bright as Regulus.

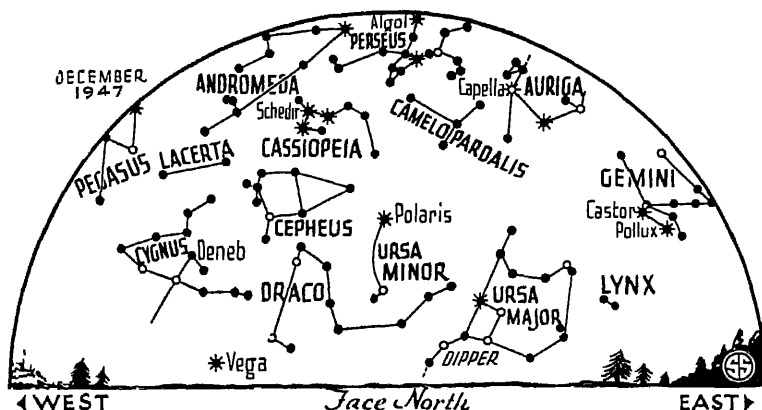
Greatest Optical Feat

Though the year now coming to a close brought an unusually good total eclipse of the sun, a number of comets and other celestial happenings, perhaps it will be best remembered in astronomical history as that which marked the completion of one of the greatest optical feats ever attempted—the world's largest telescope mirror. But completion of the mirror—200 inches in diameter—to the exquisite degree of accuracy which such a piece of glass requires, marks only the end of one stage in a still larger project. The mirror has just been hauled on special trucks from Pasadena, where it was ground and figured, up the road to Mt. Palomar in southern California, where it will be placed in the huge telescope mounting which has been waiting for several years to receive it.

This telescope, built with Rockefeller money furnished through the International Education Board, goes back to 1927. In that year, lecturing before the Astronomical Society of the



◊ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



Pacific in Los Angeles, Dr. Francis G. Pease announced the practicability of such an instrument. A member of the Mt. Wilson Observatory staff, he had designed the 100-inch telescope there which is still the world's largest in operation. But even more responsible for the actual completion of the instrument was Dr. George Ellery Hale, organizer and first director both of the Yerkes and Mt. Wilson Observatories. He wrote an article, "The Possibilities of Large Telescopes," which appeared in *Harpers Magazine* in April, 1928. With the aid of copies of this article he secured the necessary financial backing for a 200-inch instrument.

Scientists Called on for Aid

Then studies were made of the best design for such an instrument, as well as the most favorable location. Experts in optics and in engineering were called in for help. It was necessary to make the enormous disk required for the mirror, which took 20 tons of glass. This was cast at the Corning Glass Works in 1934. Actually the one that has been used was the second, for there was an accident in the pouring of the first disk which made it necessary to do it over again. The mounting for this mirror, with moving parts weighing about 425 tons, yet operating with the

precision of a fine watch, was too big for any telescope maker. Instead, it was entrusted to the Westinghouse Electric Corporation, and built in their turbine plant near Philadelphia.

During 1948 the Mt. Palomar Observatory, part of the California Institute of Technology and with the 200-inch telescope as the main instrument, will come into operation. With it astronomers will reach out farther into space, to observe twice as far as we can at present. The 100-inch instrument can reach to a distance of about 500,000,000 light years, while the farthest galaxies that the 200-inch can photograph will be so distant that their light would take a billion years to reach us. Also, fainter objects will be observed better.

The main value of such an instrument is that it gathers more light than smaller telescopes, and not that it magnifies more. Irregularities in the atmosphere, even from the most favorable location, set a limit to the extent of magnification. This means, in general, that it will not show the moon or planets any better than the 100-inch does at present, since they have plenty of light already.

Studying the Galaxies

An important application will be in studying the galaxies, like that in Andromeda, which can be faintly seen these December evenings. Before the 100-inch was built astronomers were divided as to what this and similar objects really were. Photographs with the 100-inch showed the individual stars of which it consists, and one other was resolved with the same telescope. These will be seen still better now, and so will others more distant, so no one can say what new discoveries the 200-inch will bring. Certainly it will tell us a lot more about this universe in which we live.

Time Table for December

Dec.	EST	
1	5:00 a.m.	Jupiter in same direction as sun
3	8:36 a.m.	Moon passes Saturn
	6:52 p.m.	Algor (variable star in Perseus) at minimum brightness
4	7:55 p.m.	Moon in last quarter
12	early a.m.	Meteors of Geminid shower appear to radiate from the constellation of Gemini
	7:53 a.m.	New moon
14	2:34 p.m.	Moon passes Venus
16	1:00 p.m.	Moon farthest, distance 252,200 miles
18	2:58 a.m.	Algor at minimum
20	12:43 p.m.	Moon at first quarter
	11:47 p.m.	Algor at minimum
22	11:43 a.m.	Sun farthest south, winter begins in northern hemisphere, summer in southern
23	8:36 p.m.	Algor at minimum
26	5:25 p.m.	Algor at minimum
27	3:27 p.m.	Full moon
28	6:00 p.m.	Moon nearest, distance 223,000 miles
30	3:38 p.m.	Moon passes Saturn
31	5:34 p.m.	Moon passes Mars

Subtract one hour for CST, two hours for MST, and three for PST

Science News Letter, November 29, 1947

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MEDICINE

Antibodies Found in Blood Of Bleeders Prevent Clots

➤ DISCOVERY of a substance in the blood that can add extra danger to the already precarious life of a sufferer from hemophilia, hereditary bleeding disease, is announced by Drs. John S. Lawrence and Charles G. Craddock, Jr., of the University of Rochester, N. Y., School of Medicine and Dentistry in the journal, *Science* (Nov. 14).

The substance is an anti-clotting, or anticoagulant, material. Hemophiliacs live in constant danger of bleeding to death from minor cuts or from spontaneous hemorrhages because their blood clots very slowly when shed. Transfusions of whole blood or injections of an antihemophilic fraction of normal blood, extracted by Dr. Edwin J. Cohn of Harvard, ordinarily save the bleeder by speeding up the formation of a blood clot.

These usually successful agents failed to speed clotting in the cases of two men seen by the Rochester doctors. Not only that, but the blood of the two men slowed down the clotting time of normal blood.

The reason, the Rochester scientists believe, is that the blood of the two hemophiliacs had developed antibodies against the clotting material in normal blood. The antibodies are thought to have developed as a result of repeated transfusions of whole blood previously given the two men.

Other hemophiliacs may develop the same antibodies, and this may account for their failure to respond to blood transfusions and antihemophilic blood globulin given to stop their bleeding

Science News Letter, November 29, 1947

YOUR

HAIR

AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

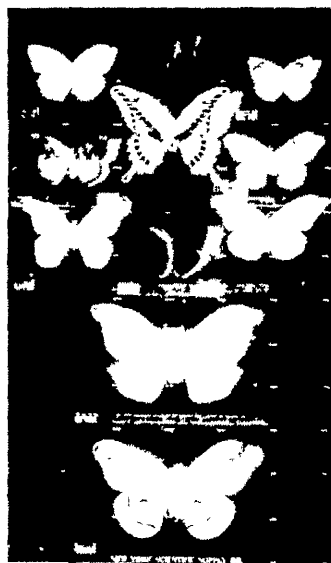
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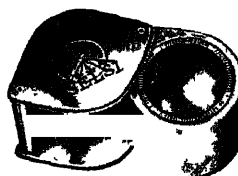
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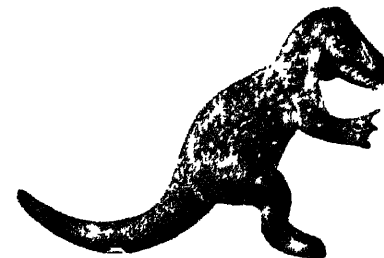
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☼ **STORAGE BATTERY**, a non-spillable type for airplanes, eliminates the need for the enclosure box or compartment now required by government regulations. The battery is made spill-proof by means of a patented vent manifold device which permits it to be inverted with safety.

Science News Letter, November 29, 1947

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☼ **WARM-FOOD OVENS** for airplanes are sturdy, compact compartments that hold six trays of food at a temperature of from 140 to 200 degrees Fahrenheit. The oven, shown in the



picture, weighs 15 pounds and can be easily handled by the stewardess. It is heated by plugging into the plane's electrical system.

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Science News Letter, November 29, 1947

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Question Box

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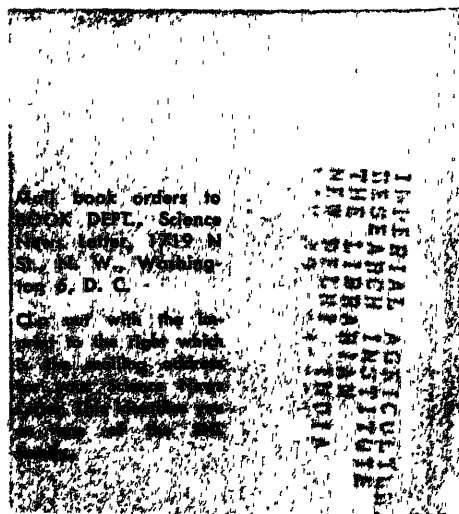
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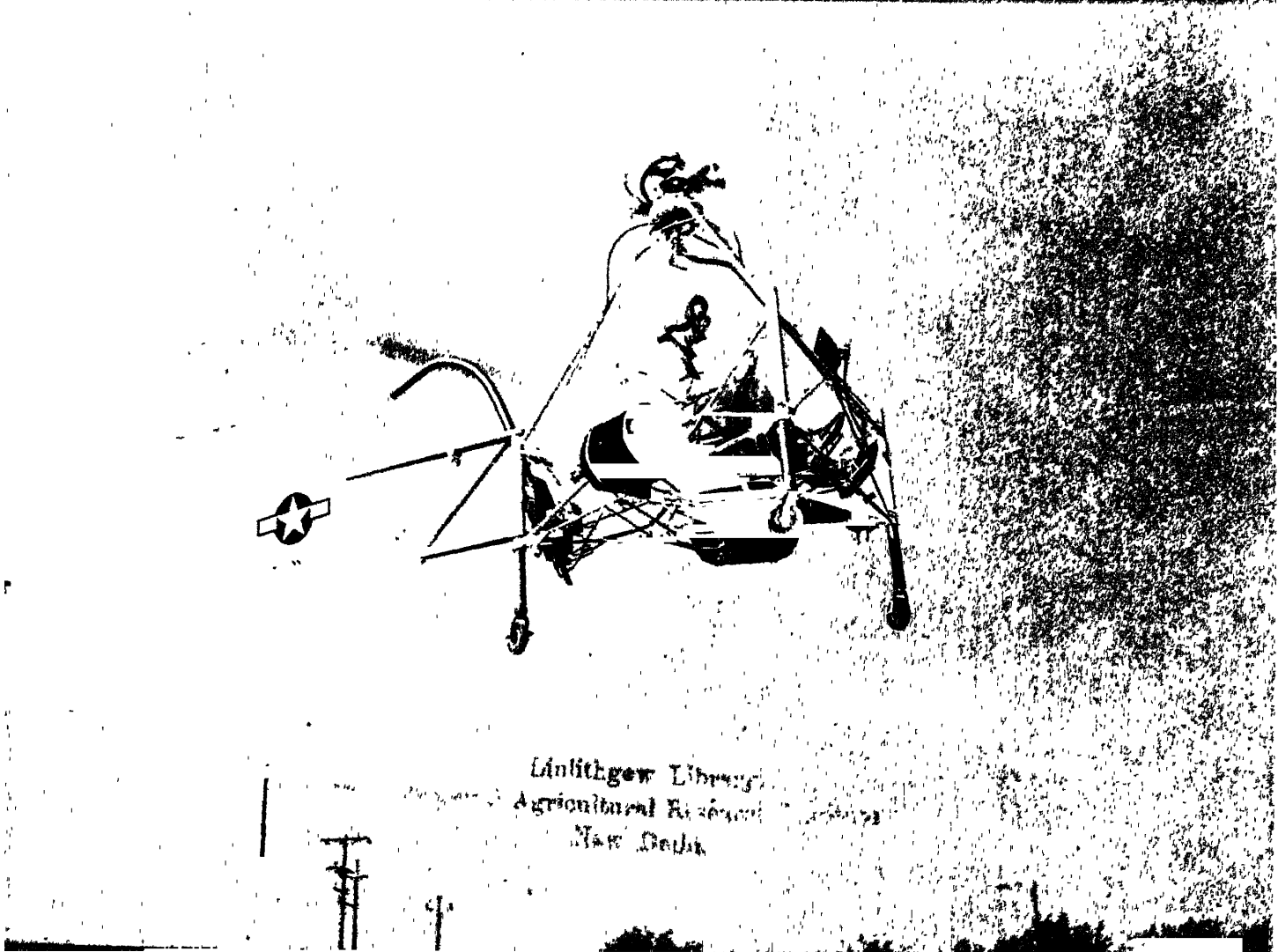
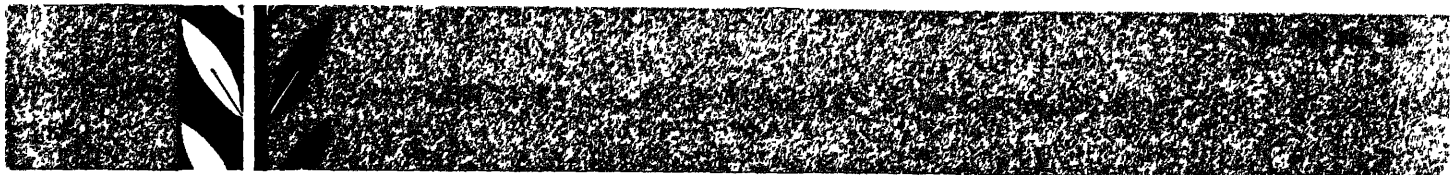
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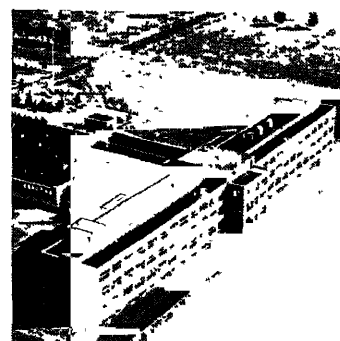
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MEDICINE

Extract May Save Babies

One in every 170 babies are threatened with Rh blood death which might be averted with a red blood cell extract being made in Baltimore and Pittsburgh.

➤ A RED blood cell extract which may save babies from Rh blood death is now being made in the Baltimore Rh typing laboratory, Dr. Milton S. Sacks, University of Maryland Medical School scientist who is head of the laboratory, announced at the meeting of the Southern Medical Association at Baltimore.

One in every 170 babies is threatened with this death, the Baltimore laboratory found in a study of some 30,000 expectant mothers.

The death is due to a condition called congenital hemolytic disease of the newborn. It occurs when the unborn baby has inherited Rh positive blood from its father while the mother has Rh negative blood. The mother develops antibodies to her unborn baby's Rh positive blood, just as a person develops antibodies against typhoid germs after vaccination. But these anti-Rh antibodies get into the unborn baby's blood and gradually destroy his red blood cells.

The blood extract Dr. Sacks is working on would neutralize the anti-Rh material in the mother's blood and prevent its harmful effect on the baby. It is made from Rh positive blood cells. It was first made and reported by Mrs. Bettina B. Carter of the Western Pennsylvania Hospital Institute of Pathology at Pittsburgh. Dr. Sacks emphasized that the work is still experimental, and he does not know yet whether the extract will be successful.

Chief weapon doctors now have for fighting the Rh danger is to test the expectant mother's blood so they can be prepared to handle Rh trouble in the baby when it is born. If the mother is Rh negative and develops strongly anti-Rh blood, it may be necessary to change the baby's blood when it is born. This is done by draining all its Rh positive blood and replacing it simultaneously with Rh negative blood.

Persons who have repeated transfusions

of whole blood as well as expectant mothers may have Rh trouble, Dr. Sacks pointed out. Most people, 85%, have Rh positive blood, but if one of the Rh negatives gets many transfusions of Rh positive blood, he will develop antibodies against the latter. Then, when he gets another transfusion of Rh positive blood, he may have a serious reaction.

Mrs. Carter and Dr. Joseph Loughrey, Pittsburgh obstetrician, have been using her red cell extract for a number of months. It has been given to expectant mothers to prevent development of Rh trouble in the babies before they are born and has also been given to babies with this dangerous condition after they were born.

Results have been promising with both methods of giving the extract. It may therefore become both a cure and a preventive. But Mrs. Carter, like Dr. Sacks who has been following her work, says that it is still experimental.

Science News Letter, December 6, 1947

MEDICINE

Lead Poisoning Cured By War Gas Antidote

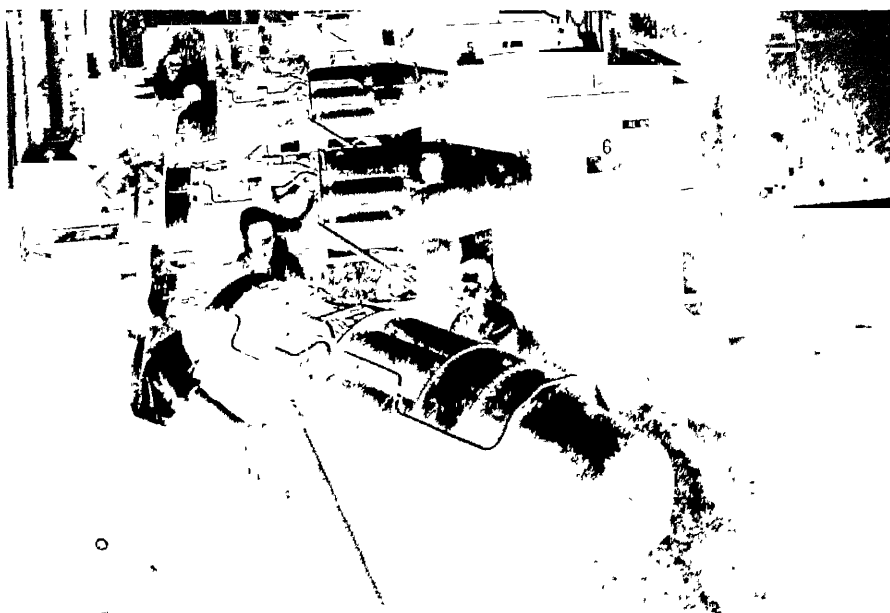
➤ LEAD poisoning, once rated a hopeless disease afflicting painters, has been cured by use of a chemical developed during the war to combat war gas.

Complete recovery of a lead-poisoned sailor followed his treatment with BAL, or British Anti-Lewisite, the medical profession was told by Dr. James G. Telfer, U. S. Public Health Service surgeon, in a report to the *Journal of the American Medical Association* (Nov. 29).

BAL has proved effective previously in treating poisoning due to mercury, arsenic and other heavy metals. The BAL chemical literally pulls the lead out of the bones and tissues of the victim's body.

The patient was a boatswain who mixed all the paint used on board his ship, making a special effort to get "good lead paint." He mixed the paints in a small, poorly ventilated space and also stated that he sometimes ate without washing the paint off his hands. He was brought to the U. S. Marine Hospital in San Francisco because of his vomiting, diarrhea and cramps.

Lead poisoning was suspected because of his "pasty" appearance, presence of a "lead line," consisting of a narrow margin of tiny gray or black spots near the edge of the gums, pain in the abdomen



JET ENGINES—These torpedo-shaped power-plants are used in 10 different types of jet-propelled military aircraft, ranging from single-engine fighters to a series of two, four, six and eight-engined bombers. The Navy's Douglas Skystreak is among the aircraft powered with this jet engine, known in the Air Force as the J-35.

and his exposure to lead. It was only after he received injections of BAL that the diagnosis of lead poisoning was confirmed, since the drug increased the discharge of lead from the points of concentration in the body.

This action of BAL's is an aid to diagnosis, since the amount of lead ex-

creted can be measured by laboratory methods and thus confirms what is only suspected on the basis of a physical examination.

Two weeks after the first injections of BAL the patient again received the drug. Treatment lasted for five days, after which he was well and was dismissed.

Science News Letter, December 6, 1947

MEDICINE

Lessen Appendix Hazard

A striking reduction in deaths from ruptured appendix has resulted from improvements in caring for patients but delays in seeking treatment are still killing many.

➤ IMPROVEMENTS in caring for patients operated on for ruptured appendix have brought a striking reduction in deaths, but delay in calling a doctor and going to the hospital is still killing many, Drs. Edward S. Stafford and H. William Scott of the Johns Hopkins University School of Medicine and Hospital told members of the Southern Medical Association meeting in Baltimore.

Twenty years ago, patients operated on at Johns Hopkins for appendicitis with perforation, or rupture, of the appendix, died at the rate of 18.8%. Today the death rate for this condition is 7%.

Four factors are chiefly responsible for this saving in lives, the surgeons stated. In order of importance these are:

First, injection of fluids and salts into the patient's veins; second, decompression of the stomach and intestinal tract by the Miller-Abbott tube or other suction apparatus; third, improved recognition and treatment of the complications of ruptured appendix; and fourth, treatment with sulfa drugs and penicillin.

More lives might be saved, the sur-

geons suggest, by use of anti-blood clotting chemicals or tying off a vein in the leg to prevent pulmonary embolism or, as it sometimes popularly called, a clot in the lungs. This condition caused seven of 26 deaths in patients with abscess around the appendix at the time of operation. Most of these patients who developed pulmonary embolism were over 50 years of age.

No improvement in dealing with the problem of appendicitis has been made by the lay public or by the physicians consulted by patients before coming to the hospital, the surgeons pointed out. The number of patients who delay going to the hospital and, therefore, the number with ruptured appendix has not changed during the period surveyed. Twelve of the 23 patients who died of ruptured appendix in the period 1939-1947 had been seen by a physician more than 24 hours before going to the hospital.

In contrast to the 7% death rate from appendicitis with rupture, there were only two deaths in over 1,400 consecutive operations for simple acute appendicitis without rupture.

Science News Letter, December 6, 1947

PHYSICS

Study Cosmic Rays in Alps

➤ THE high-altitude laboratory at Pianrosa, near Cervinia in the Italian province of Aosta, may become an international center for European scientists studying cosmic rays. This was suggested at a recent conference on cosmic rays held in Cracow, Poland, under the auspices of UNESCO.

This laboratory, which was prefabricated and transported to a site nearly

two miles high, includes both a large laboratory, 20 by 30 feet, and living accommodations for four persons. A cable railway connects it with a guest house 3,000 feet below. Food and materials are procured at the lower station and eight more persons can stay at the guest house. The unique laboratory is open all the year.

Director of the cosmic ray center is

a young Italian scientist, Gilberto Bernardini, who will be a visiting professor at Columbia University in New York during the first six months of 1948. During his absence, Prof. E. Amaldi, director of the Nuclear Physics Center in Rome, and Dr. Ettore Pancini will be in charge.

Like American scientists studying cosmic rays, the Italians at their mountain laboratory are seeking to solve the mysteries of the meson, also called mesotron, a high-powered, short-lived particle found only in cosmic rays.

Prof. Bernardini said that he would welcome research workers from any country and that they would find a very congenial atmosphere—in spite of the many limitations which present conditions in Italy impose.

Science News Letter, December 6, 1947

SCIENCE NEWS LETTER

Vol. 52 DECEMBER 6, 1947 No. 23

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

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MEDICINE

Mold Remedy No Cure-All

There are a few known conditions for which streptomycin is effective but whether to use it is still a problem because this remedy is so new.

➤ IF you get tularemia, or rabbit fever, your doctor will almost certainly give you streptomycin. But if you get typhoid fever, he will not give you streptomycin. And if you get a blood stream infection or blood poisoning from a hemolytic streptococcus germ, he will give you penicillin.

The average layman, having read much about streptomycin, the powerful mold remedy, is likely to expect his doctor to prescribe it for almost any ailment. The average physician may at times be perplexed over whether to give or not to give streptomycin. The reason for the physician's perplexity is that this remedy is so new its exact place as a medicine has not yet been completely determined.

To help the physician, the *Journal of the American Medical Association* (Nov. 29) lists diseases and infections for which streptomycin is and is not good medicine.

The conditions for which streptomycin is effective almost all have long, unfamiliar names. They include, besides tularemia, urinary tract infections, wound infections and bacteremias (blood stream infections) due to *Escherichia coli*, *Bacillus proteus*, *Pseudomonas aeruginosa*, and *Aerobacter aerogenes*; plague; meningitis due to all gram-negative bacilli; infections due to *Klebsiella pneumoniae*, and *Shigella dysentery*.

Streptomycin is reported occasionally effective, but penicillin is the drug of choice, in bacteremia and septicemia due to hemolytic streptococci; endocarditis (a kind of heart disease) due to green-producing streptococci; *Staphylococcus aureus* and *albus* infections, and anthrax.

Penicillin is not the drug of choice for diphtheria. Streptomycin may be effective, but is powerless against the toxin, so anti-toxin should always be the primary treatment.

Streptomycin is partially effective but the extent of its usefulness is still undetermined in whooping cough, tuberculosis, leprosy and gonorrhea.

Streptomycin is generally not to be used at present in typhoid fever, paratyphoid fever, amebic dysentery, undulant fever, toxoplasmosis, histoplasmosis, acute rheumatic fever, disseminated lupus erythematosus, localized lupus erythematosus, infectious mono-nucleosis, pemphigus, acute and chronic leukemia, ulcerative colitis, coccidioidomycosis, malaria, poliomyelitis and all other virus infections, blastomycosis, moniliasis, and syphilis.

Science News Letter, December 6, 1947

MEDICINE

Vitamin K Aids Chilblains

➤ NEW treatment for chilblains that your doctor may be using this winter consists in doses of vitamin K, the anti-bleeding vitamin. Favorable results with a trial of this treatment during the prolonged spell of severe weather in England last winter are reported by an English physician, Dr. D. P. Wheatley, in the *British Medical Journal* (Nov. 1).

Factor predisposing to chilblains are believed to be defective circulation in the extremities, increased permeability of the walls of the blood vessels and lessened clotting ability of the blood, Dr. Wheatley points out. Since these same abnormalities are present in per-

sons deficient in vitamin K and are corrected by giving the vitamin, he thought it logical to try the vitamin as a remedy for chilblains.

One of his patients was a 37-year-old man who had suffered from chilblains "ever since he could remember." No other remedy had helped and when Dr. Wheatley saw him all his fingers and toes were dusky red and swollen, with signs of ulcers on several of the toes. He was given one injection into his muscles of a synthetic vitamin K. A week later he reported in delight that for the first time he had obtained relief from the chilblains. His fingers were nor-

mal and the toes had only a slight swelling left.

Complete relief of signs and symptoms was obtained in another three patients and improvement in four more. Although giving the vitamin by injection was considered better than giving it by mouth, the injections caused considerable pain and had to be abandoned.

Science News Letter, December 6, 1947

ZOOLOGY

Odd Newcomers Are Received by Chicago Zoo

➤ LIZARDS that walk on water and three-toed sloths are the oddest newcomers to the Chicago Park District's Lincoln Park Zoo, which boasts a new assortment of nearly 170 specimens from Central America.

The lizards, about two feet long, are basilisk lizards which have a sort of skimming walk as they travel over the water. Spanish-speaking natives call them "Jesus Christo." They live in trees and along the banks of streams in their native Central American habitat.

Sloths, the "upside down animals," come in both two-toed and three-toed varieties. But the three-toed ones collected by Oden and Olivia Mecker of Chicago and shipped to the zoo are the more rare specimens.

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NEWCOMER—This three-toed sloth was recently received at the Chicago Park District's Zoo in Lincoln Park. It is often referred to as the "upside down" animal and is the "A?" of crossword puzzles.

ASTRONOMY

New Guider for Telescopes

This new automatic device operates through a photoelectric cell which is activated by a small part of the starlight which is reflected from within the telescope.

➤ **GIANT** telescopes used by astronomers will automatically follow the stars on which they are pointed by means of a new guiding device developed at Mount Wilson Observatory, Pasadena, Calif., by Horace W. Babcock. A description of the instrument appeared in the *Review of Scientific Instruments* (Nov.), a publication of the American Institute of Physics.

The heart of the new guiding device is a photoelectric cell which is activated by a small part of the starlight which is reflected from within the telescope. The cell, in turn, operates the mechanism to keep the telescope directed on the star. The guider is now in use on the Mount Wilson 100-inch telescope.

In photographic work with large telescopes, constant manual control is usually necessary. This is particularly true in spectrographic work, where the image of the star must be kept accurately on the spectrographic slit in the instrument through which light passes to form the

star's spectrum. The new device is particularly valuable for this work because stars studied are generally brighter than the guide stars usually available in direct photography.

In spectrographic work, a part of the light of the star does not enter the slit but is reflected back by its polished knife-edge jaws. The new device uses a fraction of this reflected light. A small guiding telescope is used for observing the slit. Its eye-piece, where the image of the slit and star is formed, is converted into a scanning device by use of a small internal coaxial tube, mounted in ball bearings and rotated by a miniature motor.

Any deviation of the star from the axis of the rotating tube results in modulation of the light transmitted by the eyepiece into a multiplier-type phototube. The output of the tube therefore varies, and is used after amplification to operate the mechanism to adjust the pointing direction of the telescope.

Science News Letter, December 6, 1947

VETERINARY MEDICINE

Plan To Fence Off Border

Recommend vaccine made by International Commission to fight foot and mouth disease in Mexican cattle. Won't affect trade.

➤ **DEFENSE** against foot and mouth disease in Mexico, now that the war against the virus has settled into the long-drawn-out siege phase, may require fewer instead of more men, Dr. B. T. Simms, chief of the Bureau of Animal Industry, U. S. Department of Agriculture, stated in a Science Service interview. Operations will continue to be on an international basis, with American field men working alongside their Mexican colleagues in maintaining the strict quarantine that will be necessary.

Two lines of defense have been drawn up. One of them is deep in Mexican territory, from 350 to 700 miles south of the border, along the edge of the area of known infection. The second is along the border itself.

The project for a high woven-wire fence along the whole boundary, capable of preventing the crossing of either man or beast, which was proposed but not acted upon when the outbreak first occurred, has now been revived. An appropriation for its construction will be asked of Congress; Texas cattlemen are especially active in its support.

Such a fence will have value beyond simply preventing the unauthorized passage of possibly diseased cattle, Dr. Simms pointed out. Hoofed game animals, especially deer, are capable of carrying the virus, and it will be highly dangerous to have them freely crossing and re-crossing the border if the disease ever makes its way farther north. The fence should also be a material aid

to the border patrol in checking illegal crossing of the boundary in either direction, particularly by smugglers.

Present commercial relations between the United States and Mexico will not be affected in any way by the foot-and-mouth quarantine, Dr. Simms stated. Practically no meat or green hides have been entering recently, and since the virus is destroyed in the tanning process it is quite safe to bring in Mexican leather goods.

Vaccine for Mexico's fight to save her cattle will either be made by the International Commission or by private firms under its supervision, if the Commission's recommendations are adopted by the Mexican government. Unsupervised vaccine manufacture is too apt to result in a product of low potency.

Up to now, foot-and-mouth disease vaccine has been made by inoculating animals, isolating the virus after they develop the disease, and reducing its power for ill by chemical treatment. Use of living animals makes the product costly. Lately experiments have given hope that it can be made in glass vessels, with the virus feeding on animal tissues obtained from slaughter-houses. If this works out, costs will be materially reduced.

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VETERINARY MEDICINE

Deer Are Worst Danger In Foot-Mouth Disease Area

➤ **REPORTS** that hoofed game animals may be infected wholesale in the Mexican foot-and-mouth disease area have aroused considerable interest among wildlife scientists. If wild animals do pick up the disease, the situation will become very serious.

Most probable victims would be deer, which are fairly numerous in the wilder parts of central Mexico. Deer would be very difficult to exterminate completely, since they run singly or in small groups and are quite skilled in hiding in brush and second-growth forest.

Antelope would present no great problem, for there are few or none of them in the area. They are animals of the open, much more easily hunted than deer, if ordinarily illegal means like jeeps and helicopters are used.

Wild pigs known as peccaries or javelinas may become infected. If they do, they should not be too difficult to run down and exterminate, for unlike deer and antelope they move and feed in compact herds.

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MEDICINE

Thyroid Saves Unborn

Daily doses of this gland extract have been found to help women who lose their babies prematurely to give birth to living infants.

➤ MANY of the women who lose their babies prematurely may be helped to give birth to living infants by small daily doses of thyroid extract. Studies showing this were reported by Dr. Eleanor Delfs of the Johns Hopkins School of Medicine to the Southern Medical Association meeting in Baltimore.

In 31 of 45 patients she studied, a deficiency of thyroid hormone was found. Deficiencies of a sex hormone and of vitamin E occurred in a few of the cases. The thyroid extract should be given starting three to four months before the woman undertakes to have a child and should be continued during the pregnancy. Failure to start the hormone treatment early enough probably accounts for disappointments in some cases in which it has been used in the past.

In addition to the hormone treatment, vigorous sports, strenuous activity and

hard work are banned throughout pregnancy for these patients. Sedentary work and ordinary household duties are permitted, but the women are warned to avoid getting over-tired. It is usually not necessary for them to have long periods of rest in bed.

Of 39 patients who had previously had 155 pregnancies, only 12 bore living babies. These same women, after study and treatment, have borne 29 living infants in 43 pregnancies.

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AERONAUTICS

British Airliner Small Compared to Hercules

➤ THE British are boasting that their new Brabazon I airliner is bigger than anything which has yet flown, but it is far outclassed in size by the Hughes Hercules flying boat now under surface

taxi tests, which recently made one short flight.

The Brabazon has a wingspan of 230 feet, the Hughes craft has a spread of 320 feet. The fuselage of the British airliner is 177 feet, the American flying boat is 220 feet long. Comparisons may not be exactly fair, for one will use landing fields, the other the water.

Although the British giant aircraft has not flown yet it is out of the hangar where it was constructed.

The Brabazon is a 126-ton craft, designed for passenger-carrying from London to New York. It will be able to accommodate 120 persons, or a total of 24,000 pounds.

The carrying capacity of the Hercules, primarily a cargo craft, is not yet known but is estimated to be four times that of the war-tested veteran Martin Mars which on one trip carried 35,000 pounds of cargo. The Mars is 220 feet in wingspan and approximately 117 feet in overall length.

Size alone is not the only point of interest in the eight-engine Hercules. It is of plywood construction rather than of the usual light metals such as aluminum and aluminum alloys. This plywood consists of built-up panels and beams of very thin sheets of wood, with each alternate layer laid crosswise, and the whole strongly bonded with a resin.

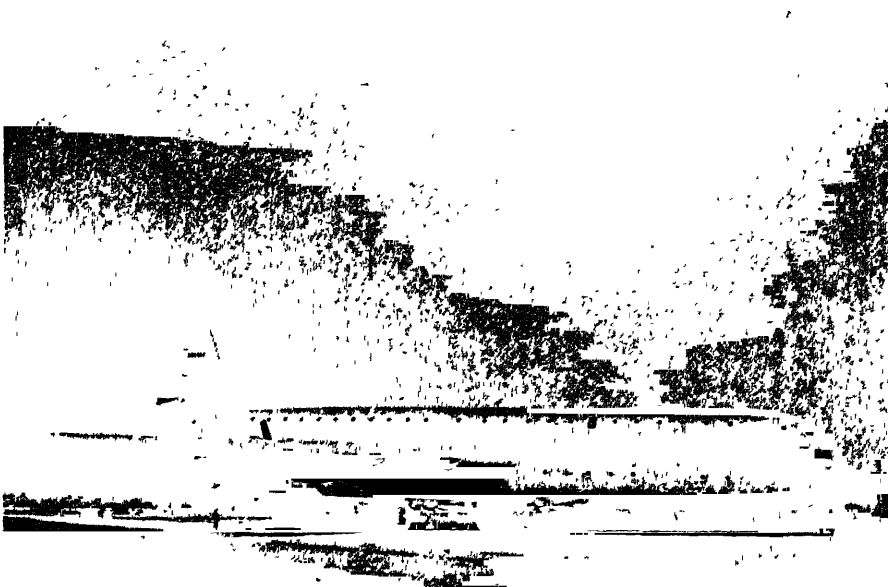
Hughes' Hercules flying boat, which has proved that it can fly, also has a rival in weight-carrying capacity in the new giant land-based Air Force transport, the Consolidated-Vultee XC-99, which is now undergoing flight tests.

The XC-99 is estimated to be able to carry 400 troops or 100,000 pounds of cargo. The Hughes boat could probably carry 600 troops.

The new XC-99 is a cargo brother of the B-36, the Air Force's biggest bomber, which is roughly 40% larger than the famed B-29 Superfortress. It will have a range of 1,500 miles fully loaded, but with reduced load can fly non-stop some 8,000 miles. This means that the bomber could take off from the new airport under construction in northeastern Maine, deliver bombs to western or central Europe and return without a stop.

While the XC-99 is designed particularly for cargo carrying, it can also be used for the transportation of airborne troops. It is powered by six Pratt-Whitney engines of the pusher type, turning 19-foot reversible-pitch propellers. It has a cruising speed of about 300 miles an hour. Its wingspan is 230 feet and its length is about four-fifths of this.

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RIVAL—In weight carrying capacity, this new giant transport rivals Hughes' Hercules flying boat. The Consolidated-Vultee XC-99 is the world's largest land-based plane and the Air Force's largest transport capable of carrying 100,000 pounds of cargo.

MEDICINE

Ruptures Repaired With Tantalum Wire Gauze

► **SUCCESSFUL** use of tantalum gauze for repair of ventral hernias, or ruptures, was announced by Dr. Amos R. Koontz of the Johns Hopkins School of Medicine at the meeting of the Southern Medical Association at Baltimore.

Tantalum has previously been used by surgeons in the form of wire for stitches and in plates or disks to repair skull defects. The supply of the metal in the form of gauze has until recently been very limited and at times it was not procurable at all. It is now available on the open market, Dr. Koontz has been informed.

Dr. Koontz uses the gauze in repair of large hernias where there is not enough of the patient's own tissues to close the defect, and in smaller ones where the surrounding tissues are weak. Most of the cases occur in very fat people. The tissues surrounding the hernia are often weakened by infiltration of fat.

The tantalum gauze is stitched over the hernial defect with tantalum wire stitches. Dr. Koontz first used the material to repair defects in dogs made by removal of six inches of muscle. Examination of the repaired defect several months after the operation showed that in each case it had become completely closed by the metal mesh with tissues growing through the meshes of the gauze in every place.

"A firmer and more thorough-going closure of the defect can scarcely be imagined," Dr. Koontz reported.

Following this experience with dogs, the tantalum gauze was used on five patients. The first operation was performed 17 months ago, the most recent six weeks ago. All have excellent results so far.

Two other surgeons, Dr. C. R. Lam of Detroit and Dr. T. D. Throckmorton of Des Moines, Ia., have told Dr. Koontz that they also had used tantalum gauze in a few cases of hernias.

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GENERAL SCIENCE

Science Writing Awards Of \$1,000 Are Announced

► **STORIES** of blood research have won \$1,000 George Westinghouse Science Writing Awards for George A. Keaney of the New York World-Telegram and Steven M. Spencer, associate editor of

the Saturday Evening Post, the American Association for the Advancement of Science announced.

The second annual award for newspaper science writing was made to Mr. Keaney for his series of articles, "Blood—Still a Mystery of the Ages." The first magazine award went to Mr. Spencer for "New Hope for the Anemic," an article which appeared in the Saturday Evening Post.

Honorable mention in the magazine writing class was given to Drs. Lorus J. and Margery J. Milne of Burlington, Vt., for an article on life in the thin film of "dry water" found on the surface of bodies of water. Their prize-winning article was published in *Natural History*. No honorable mention award was made for newspaper writing.

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WILDLIFE

Game Animals Show Abundant Meat Yields

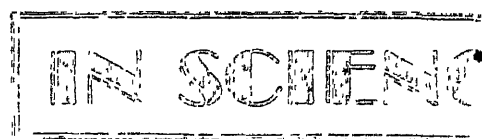
► **MEAT** no less than sport will be on the mind of every hunter now. Interest therefore attaches to data on the percentages of edible meat, in terms of live weight, obtainable from various game animals presented by Prof. W. J. Hamilton, Jr., of Cornell University. (*Journal of Wildlife Management*, Oct.) Most precise studies were made on the carcasses of nine deer, brought in from various parts of New York and carefully dressed by skilled workmen. Calculated live weights ranged from 113 to 221 pounds, yielding from 55.7% to 60.6% of edible meat.

Largest animals on the average gave highest percentage yields in meat, Prof. Hamilton states. Number and position of wounds, and care in bleeding immediately after killing, he adds, affect amounts that have to be lost through trimming. Head and neck wounds are least wasteful of meat.

Of smaller mammals, the cottontail rabbit, most abundant of New York's game species, dresses 53.1% edible meat on the average. The snowshoe hare, a considerably larger animal, yields 58.2%. Gray squirrels, small though they are, produce 55% meat on their live-weight basis.

Applying his data to the known kill of game animals in New York during a typical pre-war year, Prof. Hamilton figures that hunters in this one state alone put about 22,270,000 pounds of meat on the table during a hunting season.

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AERONAUTICS

First Ram-Jet Helicopter Assigned to Military Use

See Front Cover

► **THE** latest addition to the United States Air Force's fleet of post-war aircraft is the world's first ram-jet helicopter which weighs only 310 pounds. It is shown on this week's cover of the *Science News Letter*.

The simplicity of construction and maintenance makes it an ideal aircraft for some military operations such as short-range observation, communications, artillery spotting and courier service.

The ram-jet helicopter was developed through the cooperation of the Air Force's Air Materiel Command, Wright Field, Dayton, Ohio, and McDonnell Aircraft Corporation, St. Louis, Mo.

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CHEMISTRY

New, Tough Paints Made From Sour Milk Acid

► **IF YOU** were looking for paint and were told you could find it in the milk-can, your first reaction might well be to look about in alarm to see how you had strayed onto a lunatic asylum's farm.

But that would not necessarily be the case. Chemists at the New York meeting of the American Chemical Society learned, from Dr. Paul D. Watson of the U. S. Department of Agriculture, of a whole series of tough, serviceable new paints produced from lactic acid, which is the stuff that makes sour milk sour. The acid, which can be produced in immense quantities from the whey that is a problem byproduct of the cheese industry, is polymerized and made into resins with fatty acids. These resins can be spread as paint-like films.

A new idea in house-paint pigments was also proposed by F. J. Williams and A. R. Pitrot of the National Lead Company. To get pigments that will keep their color longer and wear out more slowly, they prepare fine particles of silica, to which the monobasic sulfates and silicates of lead are chemically cemented. These present a defiant wearing surface to the weather.

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E FIELDS

PSYCHOLOGY

No Fatigue Measured After Six Hours of Reading

➤ WOULD you be tired if you read for six hours at a stretch? Would you be more tired if you read from a printed book or from projected microfilm?

The surprising answers were reported to the American Philosophical Society meeting in Philadelphia by President Leonard Carmichael, of Tufts College.

There is no measurable fatigue even after two six-hour periods of reading either from a book or from microfilm. And it doesn't make any difference whether the book is dull or interesting.

The conclusion was based on a photographic record 15 miles long showing every blink of the eye, every pause, during the six-hour reading. No sign of fatigue showed up at any time, and neither was there any change in comprehension of the meaning.

The experiment was conducted by President Carmichael and Prof. Walter F. Dearborn with a number of associates. Twenty college and high school students did the reading.

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GENERAL SCIENCE

Italian Scientists Lack Funds for Research

➤ SCIENTIFIC research in Italy which has produced such outstanding figures as Enrico Fermi, Bruno Rossi, Emilio Segrè and B. Pontecorvo, to mention but a few physicists alone, is now languishing for lack of material support.

There are impressive new research buildings in the new University City, built prior to the war in Rome. Even those universities which were partly destroyed through military operations, such as those in Turin, Pisa and Bologna, have been rebuilt. But the apparatus for research is lacking.

Some radio instruments have been distributed recently from the surplus stores of the allied forces and they are much appreciated. There is a great shortage of scientific instruments, and the pay of the personnel is so low that they must take outside work to earn enough to live on.

The official salary of a university professor amounts to about \$60 per month, and assistants get only half that sum.

Total expenditure by the Italian government upon research in all fields of science during the last year was only about \$250,000, an entirely insufficient sum. If it were not for the financial help received from time to time from some of the larger industrial concerns such as Fiat, Snia Viscosa and Montecatini, research work in Italian universities might come to a standstill.

Yet, in spite of these conditions, a small number of enthusiasts, working under great hardship, are carrying on with their research in addition to their teaching duties and outside work.

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ENTOMOLOGY

Insect Control Measures Would Save Much Grain

➤ UNCLE SAM could feed Europe's hungry peoples without having to skimp at the home table if he would only get rid of a swarm of unwanted, useless free-lunch grabbers—the grain-eating insects.

Dr. H. L. Haller of the U. S. Bureau of Entomology and Plant Quarantine, speaking before the North Jersey section of the American Chemical Society, declared that full use of modern insect control measures would easily save 100,000,000 bushels of grain. Total insect depredations account for an annual loss of 300,000,000 bushels of grain in storage, worth at least \$600,000,000. Hundred-percent control is hardly expected, but a saving of one-third the usual loss should be practicable, Dr. Haller declared.

Biggest savings can be made on the farm, for at present relatively few farmers take any protective measures against insects while they have their grain in storage, the speaker continued. Spraying wooden storage bins with persistent DDT solution is one thing farmers can easily do, he pointed out. While DDT cannot safely be used for making grain intended for food or stock feed bug-free, seed grain can be thus protected. Fumigation is the proper treatment for edible grain.

Along with protection of stored grain should go determined warfare in the field against such pests as corn borer, earworm, Japanese beetle and other insects.

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NUCLEAR PHYSICS

Atom Smasher Parts to Be Sunk Below Ground Level

➤ DANGEROUS radiation from a new atom-smasher being planned for immediate construction at the University of Washington in Seattle will be shielded against by the earth.

The electro-magnet, vacuum chamber and pumps of the new 200-ton cyclotron will be sunk below ground level. Thus, the earth will do the shielding job which expensive concrete or water-filled containers do in most other cyclotron installations.

The atom-smasher and building will cost an estimated \$375,000. Hearts of helium atoms, called alpha particles, will be accelerated to approximately 40,000,000 electron volts by the cyclotron, while deuterons, hearts of heavy hydrogen atoms, will be accelerated to 20,000,000 electron volts.

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ASTRONOMY

Selecting New Location For Naval Observatory

➤ ASTRONOMERS at the Naval Observatory are concentrating, not on the heavens, but on the earth. Since last May they have been busy selecting a site for the proposed new observatory.

The exact location has not yet been determined, but it will undoubtedly be east of the Blue Ridge Mountains. In fact, it will probably be as near to the Nation's capital as an appropriate location can be found.

It was decided to relocate the Observatory in the East principally because Observatory officials must retain easy access to other scientific agencies in the East and keep in close touch with other Government agencies located here.

The observatory must be moved from its present site because the view of the sun and stars just isn't good enough. Since it was founded over a century ago, the Nation's capital has engulfed it. Smoke and dust from the city mar the view of the heavens. Light and heat from city streets and buildings "upset" observations.

One hundred acres of land, reasonably high and level with a knoll to raise the observatory above ground haze, are urgently needed. A fairly uniform distribution of clear weather and a small daily range in temperature are essential.

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AGRICULTURE

Good Neighbor Farms

Guatemala, through a collaborative program with the U. S., is conducting experiments to improve crops that are essential to feed the world.

By MARTHA G. MORROW

From Guatemala City

➤ THE search for better corn, beans and squashes has been carried back to the very birthplace of these vegetables. Through our collaborative program, intensive research on these and many other crops is being conducted in the populous Central American Republic of Guatemala.

Success will mean that the people of Guatemala can enjoy a more balanced diet. It will also result in better food varieties here at home.

Several agricultural research stations, located from the coast up to the volcanic highlands, are run by the Instituto Agropecuario Nacional. This National Agricultural Institute is a cooperative project of the governments of Guatemala and the United States. Everything from coffee, chief export of the country, to pasture grasses is studied here. Specific problems of the local farmer are also solved.

Outpost at Antigua

Iowa State College has an outpost at Antigua, ancient capital that several centuries ago was destroyed by earthquakes. Corn, cheapest food an Indian can get and his main source of sustenance, is the chief project here. Experiments in raising other crops common to the region are also being carried on.

Bananas, among Guatemala's most important exports, are not the only crop being investigated by the United Fruit Company on their extensive experimental farm. Trial plantings of teak trees and African oil palms are being established. They are also doing work on reforestation and cattle breeding.

Three experimental fields, chosen because of their different altitudes and soils, are run by the Instituto Agropecuario Nacional. The cone of volcano Atitlan looks down on Finca Chocoma, a government farm of thousands of acres located about 2,800 feet above sea level. Part of this is utilized for experimental purposes. Situated on land sloping to-

ward the Pacific Ocean, this plantation ("finca" means farm operated on a commercial scale) is blessed with sufficient water for complete irrigation, when needed.

The best varieties of coffee trees, most satisfactory shade trees to use in protecting them from the sun, economical use of fertilizer and cover crops to prevent soil erosion are all studied on this farm. Rubber and sugarcane are also being investigated. Around a hundred varieties of beans, radishes, peanuts, cucumbers, squash and peas were sown here.

Temperate-Zone Crops

At an elevation of 7,000 feet, temperate-zone crops are grown at Labor de Ovalle. Wheat, apples and plums are raised in this region where frost sometimes nips the buds or the ripening fruit. Livestock, particularly sheep, are also grown at this experimental substation high in the volcanic mountains of the department of Quezaltenango.

Near Guatemala City work is being carried on at Finca Barcena by the Instituto. The Escuela Nacional de Agricultura (National Agricultural School) is located there and the two collaborate in the work. This finca is about 5,000 feet above sea level.

In Guatemala there are only two seasons—the dry and wet. At Finca Barcena, the dry season often starts in October and lasts until early May. During this lengthy period of drought, most of the plants shrivel up and die; there is practically no water for irrigation. In the rainy season usually less than 40 inches of rain falls, as compared with 140 inches in some other sections of the country. Part of the land slopes gently so that machinery can be used for cultivation. But much, like that of the surrounding country, is too steep to be worked except by hand.

Sometimes work on a particular project is carried out cooperatively with farmers. Neighboring fields are operated at the expense of the Institute. Or finca owners and small-land farmers cooperate at their own expense, using the services

of the agricultural experts.

The hope of the Institute is to do 75% research and 25% extension work, Dr. Rolland Lorenz, the newly-appointed director, told me.

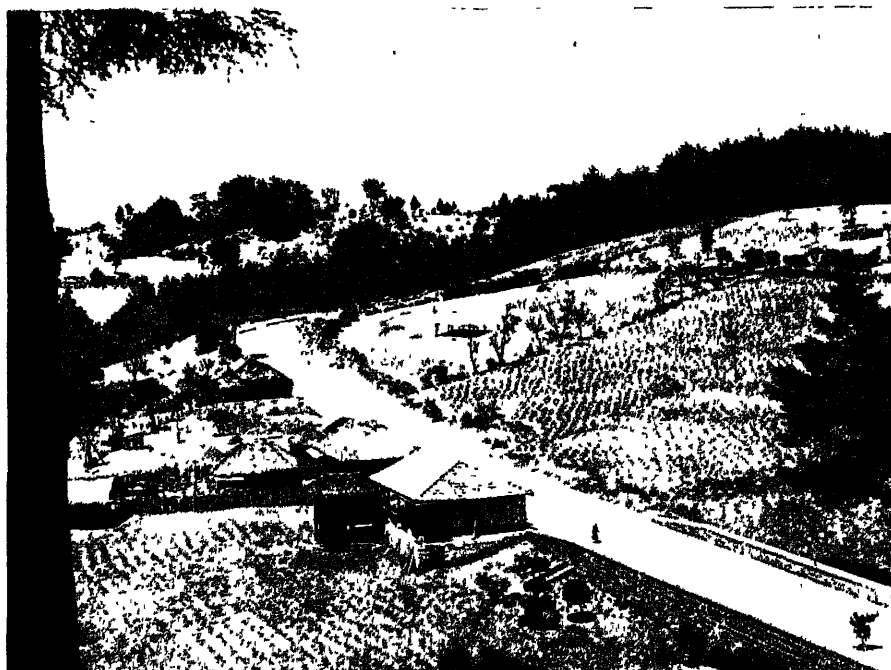
The idea of establishing a collaborative Agricultural Experiment Station sponsored by the Government of Guatemala and by the Government of the United States of North America was conceived late in 1944. By March of the next year the embryonic project had progressed so well that the two governments formally signed an agreement setting up the Instituto Agropecuario Nacional.

The primary purpose of the organization is to work on crops that we cannot grow in the United States, yet are necessary to us and can be grown in Guatemala. Rubber, cinchona from which quinine is extracted, and certain medicinal plants stand high on the list. Varieties of wheat, corn and beans grown in our sister republic must be improved, on the other hand, to help feed the workers producing these complementary crops so essential if the American continent is to be self-sufficient.

Guatemala largely finances the proj-



COLLABORATING—Dr. I. E. Melhus, director of Iowa State College's Tropical Research Center at Antigua, ancient capital of Guatemala, is carrying on experiments that may help both nations.



RAISING CORN—In the highlands of Guatemala the Indian raises this crop as the chief product on his small plot. The search for better corn has been carried to its birthplace.

ect. The institute is staffed by our Department of Agriculture scientists and Guatemalan agriculturally trained technicians. U. S. experts in horticulture, chemistry, soils, animal husbandry, agronomy and plant pathology are aided by Guatemalan assistants, enhancing their knowledge of research and extension technique.

Eventually the project will be able to stand on its own feet. Technicians and financial support will be withdrawn by the United States, leaving local men to carry on the work thus established. Graham S. Quate, our agricultural attache, points out.

Ambassador to Guatemala

This phase of our Good Neighbor program fits in perfectly with the interests and background of our Ambassador to Guatemala. Ambassador Edwin J. Kyle is a farm-minded diplomat. For 33 years this tall, lanky Southerner served as dean of agriculture at Texas A. and M. His heart and soul are in this research pointing the way to better crops and improved livestock in Guatemala and the United States.

Antigua was chosen by Iowa State College as a good place for research because many important plants grown in the United States originated in this region. Guatemala is believed to be the home of upland cotton, some kinds of

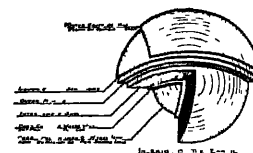
corns, many varieties of beans, peppers, sweet potatoes and some squashes. It is also the land in which such flowers as zinnias, dahlias and cosmos originated, Dr. I. E. Melhus, director of the project, pointed out when I located him in his headquarters next to a beautiful 200-year-old church.

This outpost of the college is set up to carry on researches in economic plants grown in Iowa and the midwest, corn in particular. Searching for germ plasm that will enhance our corn varieties at home, the group of six hopes also to develop improved lines to be given to the people of Central America. Corn that looks promising has already been found, and improved grains taken back to Iowa where they are being tried.

The influence of climate on corn is being studied at experimental plots located from sea level to 8,000 feet. From work carried on in this country slightly smaller than New York State, the Iowa State group hopes eventually to predict what corn varieties will best be suited to different climates throughout the whole American continent. Light intensity in different areas is being measured. Some day the influences of light, temperature, moisture and soil on this important crop may be fully explained.

This summer about 10,000 corn crosses were made. Seed that show promise are shipped to El Salvador,

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Honduras, Costa Rica and other countries interested in conducting their own experiments.

What is probably the largest collection of native corn varieties in the Western Hemisphere has been gathered by these scientists. Row upon row of corn, carefully dried and labeled, hangs from the roof of the storehouse.

Corn pests also stand high on the list for study. In particular, corn strains resistant to the European corn borer are being sought.

Seek New Varieties

The group is on the look-out for new fruits, vegetables and cereals that may prove useful in North America. A relative of our familiar cucumber, indigenous to the highlands of Guatemala, may be one of these. Called *cieba*, it grows upon a bush instead of hugging the ground. Thus in a small garden it takes no more room than a tomato plant.

Should you find "jam berries" on the market in the next year or two, credit this research station with introducing them. Called *atomate*, the green fruit tastes like a tomato and is about half its size. Used by the Indians as the basis of chile, it is good for salads, pies, jams and sauces.

Corn has been planted by Iowa State and rubber by U. S. Department of Agriculture experts at Tiquisate, the 23,000-acre finca of the United Fruit Company. This American company that dominates Central America's banana

trade, however, is not only host to other groups but uses the West Coast finca for its own experiments.

Miles of Pipes

Miles upon miles of pipe greet the eye, for here the value of overhead irrigation, even in a land with plentiful rainfall, is being proved. Banana diseases may also be whipped through research conducted here. Bamboo is an important project as it is needed to prop up banana trees heavy with fruit.

Here one finds the African oil palm, one of the best sources for an excellent type of vegetable oil. Teak, mahogany, rosewood and tropical cedar claim space in the experimental plot. As disease attacks banana plants, the area becomes non-productive. Such plants as African oil palm and teakwood are considered good for planting in these sick areas.

Sisal and other fiber plants, needed for making sacks and bags to carry the heavy produce, are receiving attention in this research finca. Cowpeas, velvet beans and peanuts also are to be found.

Developing and introducing crops to the small land-owner is an important project of the United Fruit Company, states A. L. Bump, one of the spark-plugs in this important research.

Today our brown-skinned neighbors eat corn, corn, corn. In the bright tomorrow they may have a diet as varied as our own. And our own diet may be improved through this research.

Science News Letter, December 6, 1947

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THE AMERICAN ANNUAL OF PHOTOGRAPHY—Frank R. Fraprie and Franklin I. Jordan—Vol. 62, 1948—*American Photographic Pub Co.*, 216 p., illus., paper, \$2.00, cloth, \$3.00. Articles on various aspects of photography, together with numerous black-and-white photographic illustrations

THE AMERICAN THESAURUS OF SLANG—Lester V. Berrey and Melvin Van den Bark—*Crowell*, 1174 p., with 57 p. supplement, \$6.50. Arranged on the same plan of "Roger's Thesaurus," including definitions where needed.

A.S.T.M. STANDARDS ON TEXTILE MATERIALS (With Related Information)—1947 issue—*American Society for Testing Materials*, 515 p., illus., paper, \$4.00.

BASIC TEACHINGS OF THE GREAT PHILOSOPHERS—S. E. Frost, Jr.—*Barnes and Noble*, 314 p., paper, \$1.00. A comprehensive summary of the views of the great philosophers of all time, on the universe, man, the nature of God, good and evil, free will and other problems of enduring interest.

CHECKLIST OF THE COLEOPTEROUS IN-

SECTS OF MEXICO, CENTRAL AMERICA, THE WEST INDIES, AND SOUTH AMERICA: Part 5 Rich E. Blackwelder—*U.S. National Museum Bulletin* 185—*Govt. Printing*, paper, 60 cents.

DISEASES OF THE NOSE, THROAT AND EAR—William Lincoln Ballenger, Howard Charles Ballenger, and John Jacob Ballenger—*Lea and Febiger*, 9th ed, 933 p., illus., \$12.50.

DYNAMIC ASPECTS OF BIOCHEMISTRY—Ernest Baldwin—*Macmillan*, 456 p., \$4.00. A text for a second course, with emphasis on subject matter exclusive of clinical problems.

EDUCATION IN GUATEMALA—Cameron D. Ebaugh—U. S. Office of Education, Bulletin 1947, No. 7—*Govt. Printing*, 82 p., paper, 25 cents.

ELEMENTS OF MINING—George J. Young—*McGraw-Hill*, 4th ed, 755 p., illus., \$6.50.

THE EVOLUTION OF GOSSYPIMUM AND THE DIFFERENTIATION OF THE CULTIVATED COTTONS—J. B. Hutchinson, R. A. Silow and S. G. Stephens—*Oxford Univ.*, 160 p., illus., \$4.25. A study of the development of the cotton plant, based on twenty years' research.

FACING THE FACTS ABOUT CANCER—Dallas Johnson—*Public Affairs Comm.*, Pamphlet No. 38, rev., 31 p., illus., paper, 20 cents. The importance of physical examination and early diagnosis are stressed.

THE FOOT AND ANKLE—Philip Lewin—*Lea and Febiger*, 3rd ed, 847 p., illus., \$11.00. A guide to the general practitioner in treating diseases of the foot and ankle.

400 YEARS OF A DOCTOR'S LIFE—George Rosen and Beate Caspari-Rosen—*Schuman*, 429 p., \$5.00. More than 80 revealing passages from the vast literature of medical autobiography, giving a composite picture of the physician.

HEARING AND DEAFNESS: A Guide for Laymen—Hallowell Davis—*Murray Hill Books*, 496 p., illus., \$5.00. This non-technical analysis is intended for all concerned with hearing loss.

THE INFLUENCE OF SEA POWER IN WORLD WAR II—W. D. Puleston—*Yale Univ.*, 310 p., \$5.00. The development of navies, and their role in World War II, considered in the light of guided missiles and atomic weapons.

JOBS FOR WOMEN OVER 35—Julietta K. Arthur—*Prentice-Hall*, 235 p., \$3.50. Describes positions for which age is a positive asset or at least is not a handicap.

KLYSTRON TUBES—A. E. Harrison—*McGraw-Hill*, 271 p., \$3.50. A theoretical text giving fundamental principles, with a basic knowledge of electronics assumed.

MATERIALS HANDBOOK—G. S. Brady—*McGraw-Hill*, 6th ed., 831 p., \$7.00. Basic reference work on industrial materials, including detailed descriptions of each material and its uses.

MATHEMATICAL THEORY OF ROCKET FLIGHT—J. Barkley Rosser, Robert R. Newton, and George L. Gross—*McGraw-Hill*, 276 p., \$4.50. A handbook for the

scientist and text for those having little previous scientific training.

MATHEMATICS FOR ALL—Kaj L. Neilson—*Barnes and Noble*, 90 p., paper, 50 cents. Simply presented mathematics, from addition to logarithms, with some special applications, including computation of interest and discounts, and payments and annuities.

MATTER AND LIGHT: The New Physics—Louis de Broglie, trans. by W. H. Johnston—*Dover*, 300 p., \$2.75. A Nobelist describes modern physics, including the atomic and quantum theories, in terms readily understandable by the layman; book originally issued in 1937.

METEOROLOGY FOR ALL—Irving Kohn—*Barnes and Noble*, 162 p., illus., paper, \$1.00. An introduction to facts about the weather.

MICHIGAN BEAVER MANAGEMENT—G. W. Bradt—*Game Division, Michigan Department of Conservation*, 56 p., illus., paper. The description, the life and habits of beavers, told in text, photographs and clever cartoons. Free from Department of Conservation, Lansing 13, Mich.

THE MINERAL KEY—Howard B. Graves, Jr.—*McGraw-Hill*, 178 p., \$4.00. A handy, pocket-sized reference work to aid the amateur in the identification of mineral specimens.

MODERN BIOLOGY—Truman J. Moon, Paul B. Mann, and James H. Otto—*Holt*, 664 p., illus., \$2.96. A comprehensive introductory biology text, including discussions of recent discoveries in medicine, chemistry, and bacteriology.

ON HOSPITALS—S. S. Goldwater—*Macmillan*, 395 p., illus., \$9.00. Hospital administration and organization, relationships between hospital and doctor, patient, and community, and basic aspects of hospital planning.

140 MILLION PATIENTS—Carl Malmberg—*Reynal and Hitchcock*, 242 p., \$2.75. What is wrong, in the author's opinion, with medicine as practiced today, and presents the case for a national program of compulsory health insurance.

YOUR TEETH AND HOW TO KEEP THEM—Jerome J. Miller—*Lantern* 232 p., illus., \$3.00. All about teeth, their construction, pathology, and care; includes a detailed description of the development of the teeth throughout childhood and adolescence.

Science News Letter, December 6, 1947

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⚙️ **STEAM CLEANER**, a portable type for cleaning automobile engines and chassis, floors, walls, building exteriors, henhouses and barns, is of welded construction and simple in design. It uses for heat either oil or gas, has a normal pressure of 100 pounds and a 90-gallon per hour water capacity.

Science News Letter, December 6, 1947

⚙️ **JEEPS** with attached plows for forest-fire fighting can dash to the scene at 65 miles an hour and lower their plow-disks for immediate action on arrival. Their two lister moldboards, with sharp root-cutting blades ahead, throw soil to the side to form a five-foot fire break.

Science News Letter, December 6, 1947

⚙️ **COOKING UTENSILS**, which resist food sticking to them, are made of two layers of stainless steel with a layer of copper between. The copper distributes the heat evenly throughout the utensil, overcoming the uneven heating in spots, the main cause of the food sticking to the pan.

Science News Letter, December 6, 1947

⚙️ **TIRE INSPECTOR** locates metallic particles buried in automobile tires in much the same way that electric detectors located explosive mines buried in the earth. The locating head of the device, which is passed slowly over the tire's surface, contains an electric coil on a plastic bobbin.

Science News Letter, December 6, 1947



⚙️ **RUG SEAL** is a liquid self-curing compound developed to hold together two pieces of carpet padding. It is applied to the square-cut edges of the padding; then the two pieces are laid on a flat surface and pushed together. After drying, a pull will tear the padding, as shown in the picture, before it opens the seam.

Science News Letter, December 6, 1947

⚙️ **ELECTRIC DEVICE** for hen houses, to shorten hours of darkness during winter months and thus increase egg production, automatically turns on small electric lamps one after another over a 15-minute period, and reverses action in

the evening. It simulates sunrise and sunset conditions.

Science News Letter, December 6, 1947

⚙️ **STOPPER FOR BOTTLES** having a pressure relief device, just patented, has a central vertical opening extending through the stopper with a valve over the top and a button with an intake mouth over the bottom. A coil spring connects the two. When sufficient pressure forms within the bottle, the valve allows relief.

Science News Letter, December 6, 1947

Modern agriculture requires continuous breeding of improved varieties of crop plants to prevent the decline of major crops.

Among land animals in the Everglades National Park, Florida, are black bears, deer, panthers, wildcats, raccoons and opossum; among amphibious animals are sea cows, otters, alligators and crocodiles.

Question Box

AERONAUTICS

What two planes challenge the size of the Hercules flying boat? p. 359.

ASTRONOMY

How does the new guider for telescopes operate? p. 358.

MEDICINE

For what diseases is streptomycin effective? p. 357.

How has firmer closure of ruptures been accomplished? p. 360.

How has the ruptured appendix hazard been reduced? p. 356.

What chemical cured lead poisoning? p. 355.

Photographs: Cover, U. S. Air Force; p. 355, General Electric Co.; p. 359, U. S. Air Force; p. 363, Dept. of Agriculture.

What gland extract may save lives of unborn infants? p. 359.

What new discovery may avert Rh blood death in babies? p. 355.

What vitamin may aid chilblains? p. 357.

PHYSICS

What laboratory may become an international cosmic ray center? p. 356.

VETERINARY MEDICINE

What two lines of defense have been drawn up against Mexico's cattle disease? p. 358.

What game animals are the worst danger for spreading the foot-mouth disease? p. 358.



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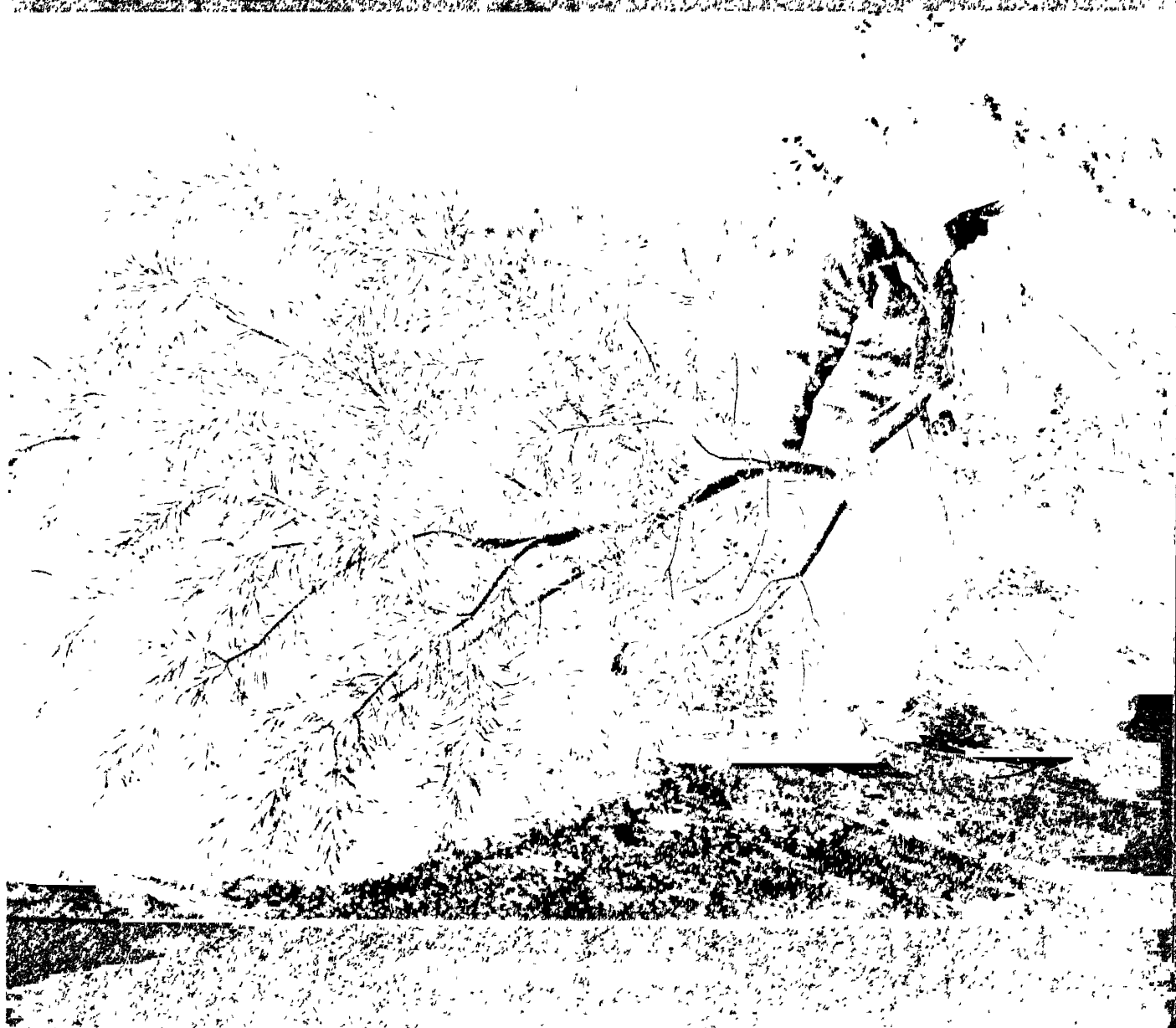


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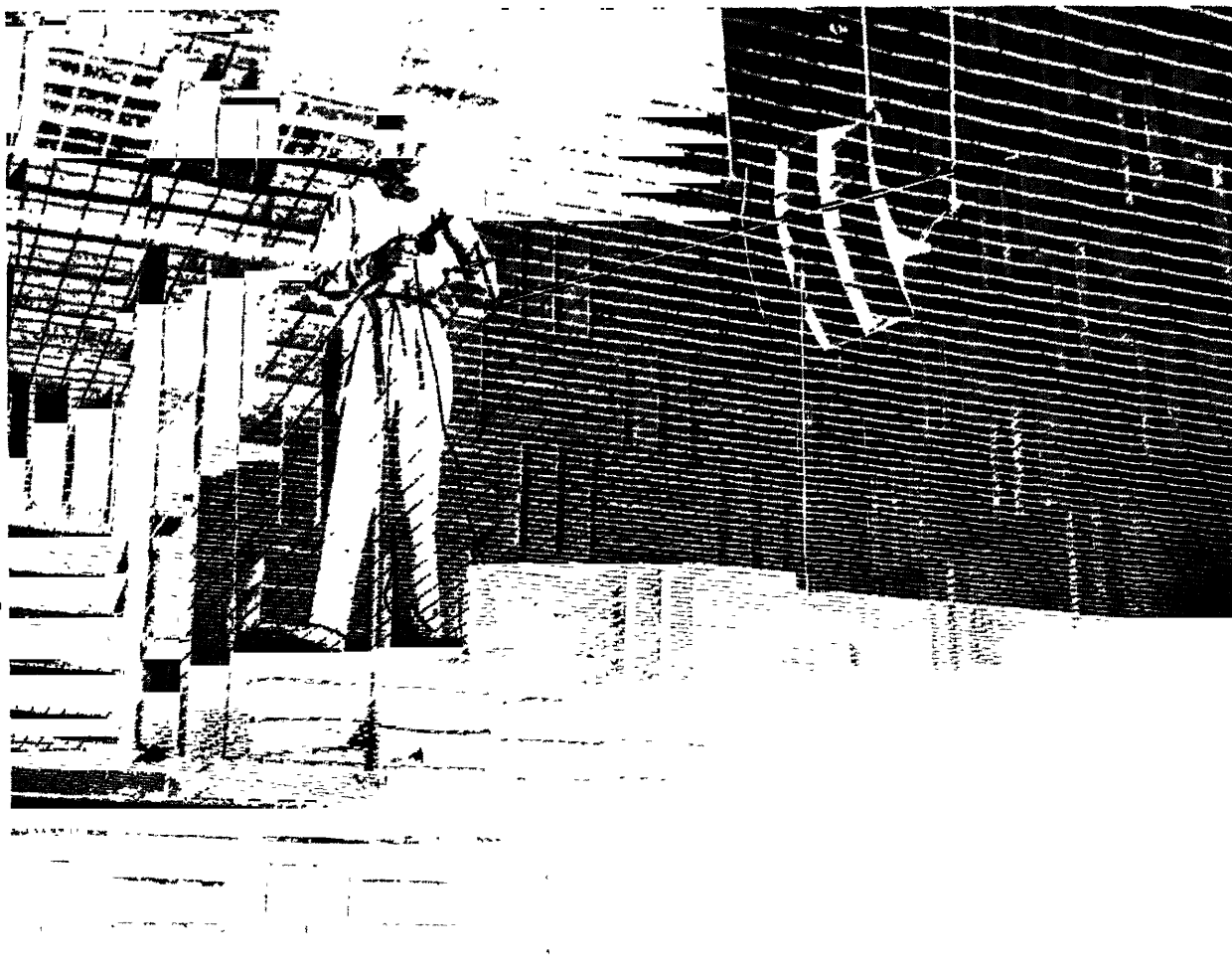


Vol. 52 No. 24

THE WEEKLY SUMMARY OF CURRENT SCIENCE • DEC. 13, 1947



A SCIENCE SERVICE PUBLICATION



A telephone listens to a loud speaker in the new "free field" acoustic test room at Bell Telephone Laboratories. The sound-transparent "floor" is built of steel cables.

Test-tube for Sound

This giant "test-tube" is actually an echoless sound room at Bell Telephone Laboratories. Here engineers seek new facts about sound which will help them make telephone service still better.

Bell scientists know a great deal about what happens to sound in electrical systems. This new room will give them a powerful tool to find out more about what happens to sound in the air.

In an ordinary living room, most of the sound addressed to you comes by way of reflections. At 10 feet less than 10% reaches you directly.

Sound that *bounces* at you from walls, ceilings, and your body is all right for hearing—but it poses questions for scientists who would study it uncontaminated by reflections.

The Bell Laboratories "test-tube" gives telephone people the chance to produce pure sound and analyze it reliably with respect to intensity, pitch, and direction. The entire room is lined with glass wool, contained in wire-mesh cases, wedge-shaped to give maximum absorbing area. Sound bounces along the sloping surfaces, sifts into the soft glass wool, and is gradually stifled.

This is one more example of Bell Laboratories' constant work to learn more about everything which can extend and improve telephone service.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for continued improvements and economies in telephone service.



MEDICINE

Fewer Cripples Foreseen

Streptomycin may prove effective in tuberculosis of the bones and joints as well as of the lungs, the larynx and vocal cords.

➤ THERE will be fewer crippled children in the future, fewer hunchbacks, fewer men and women limping through life on a stiffened or shortened leg, thanks to streptomycin.

Hailed for over a year as the first drug with real usefulness in tuberculosis, this earth mold chemical is only now being studied as a remedy for tuberculosis of the bones and joints which cripples so many children.

Doctors do not yet know whether it can do as good a job in this form of tuberculosis as it has in other forms of the great white plague.

"But there is reason to hope," says Dr. H. Corwin Hinshaw of the Mayo Clinic, "that streptomycin alone or in combination with surgery may be of considerable help in some of the most baffling problems in this field."

Scores of persons, many of them infants and young children, who would have died two years ago of tuberculous meningitis or of another previously always fatal disease, miliary tuberculosis, are alive and well today and "may be regarded as cured," he said.

Streptomycin has not cured all patients with this form of the disease, which kills thousands annually. But it is the only effective remedy in these forms of the disease.

Effective for Larynx

The earth mold chemical has been effective very promptly and in a very high percentage of cases of another form of tuberculosis. This is the dreaded and painful type which involves the larynx and vocal cords. A somewhat similar type of tuberculosis may produce ulcers in the windpipe and larger bronchial tubes. This type which has been so hard to cure by other forms of treatment responds very well to streptomycin.

Tuberculosis of the lungs accounts for more than 90% of tuberculosis deaths. This type of the disease is a destructive process, and lung tissue which has been destroyed cannot be regenerated. But there "is no longer any doubt," Dr. Hinshaw said, "that streptomycin has very great value in some of the most fulfilling types of lung tuberculosis."

Streptomycin, Dr. Hinshaw emphasized, is not the only treatment for tuberculosis. Just as the pneumonia patient who gets penicillin treatment must go to bed and be given other helpful remedies, the tuberculosis patient who gets streptomycin will need to rest in bed and get other forms of treatment as well as the mold drug. And like the pneumonia patient cured by penicillin, the tuberculosis patient who gets streptomycin also needs to be guarded during the convalescent period.

Price Now Low

Speaking in New York at the presentation to Merck and Company of the biennial award for chemical engineering achievement given by *Chemical Engineering*, McGraw-Hill publication, Dr. Hinshaw said that two and three years ago anything said or written about streptomycin had to be guarded because scientists then feared that streptomycin would never be made in sufficient quan-

tity or at a low enough price to make it available to the hundreds of thousands suffering with tuberculosis. This situation is changing, he said, and the one gram a day now considered enough in many types of tuberculosis now costs only a few dollars.

Science News Letter, December 13, 1947

GENETICS

Vitamin Content Is Being Bred into Hybrid Corn

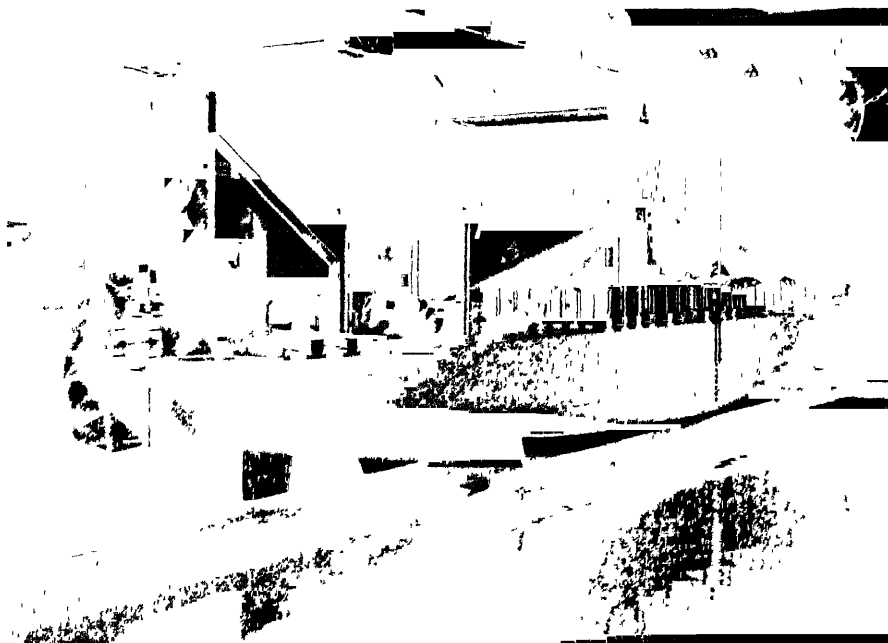
➤ VITAMINIZING corn by breeding changes into its chemical make-up is being undertaken by Pennsylvania State College scientists, L. W. Aurand, R. C. Miller and L. L. Huber.

Striking differences between the carotene content of some inbred lines of corn was found by them in experiments reported in the journal, *Science* (Nov. 21). Carotene is the yellow color which is changed to vitamin A in the body of humans and other animals.

The genetic constitution of corn may be responsible, in large part, they state, for its content of carotene.

In developing new corn hybrids, they suggest, attention should be given to the content of important nourishing factors, of which carotene is one.

Science News Letter, December 13, 1947



MODEL CARRIER—This 20-foot scale wooden model airplane carrier was installed in a testing tank at the Stevens' Institute of Technology Damage Control Research Laboratory to determine, if possible, how stable a ship is after she is damaged, when it is safe to continue fighting her, and at what moment it becomes necessary to abandon ship.

MEDICINE

Two New Drug Hazards

Warning is given that methadon, potent synthetic substitute for morphine, is habit-forming and chewing paper strips inside benzedrine inhalers may cause poisoning.

➤ METHADON, potent new synthetic substitute for morphine which has just come on the market, can cause addiction, or drug habit, just as morphine itself can.

And if you chew or swallow the paper strips inside benzedrine inhalers, you can get poisoned, hear voices, get crazy ideas, and may even die.

Warnings on these two new drug hazards, appearing in the *Journal of the American Medical Association* (Dec. 6), were given by two groups of doctors.

Two Groups Give Warning

The one on methadon is from a group of U. S. Public Health Service doctors. That on benzedrine is from two psychiatrists formerly on the staff of the Branch U. S. Disciplinary Barracks at Fort Benjamin Harrison.

Methadon was first synthesized in Germany and called 10820. It is also known as amidon and dolophine. Its success in relieving pain in cancer patients and in suppressing withdrawal symptoms in morphine addicts when they were taken off morphine is reported by Drs. Harris Isbell, Abraham Walker, Nathan B. Eddy, John L. Wilson and Clifford F. Moran of the U. S. Public Health Service.

But persons getting the drug develop tolerance to its pain-relieving and sedative, or quieting effects so that larger doses are needed after a short time. The tolerance to the pain-relieving effect develops quickly. That to the sedative develops more slowly than tolerance to morphine's sedative effect. Doses needed to relieve pain are about one-third to one-fourth those of morphine.

Methadon has been proclaimed a habit-forming drug similar to morphine and has been put under the federal narcotic laws governing the sale and dispensing of morphine and other opiate drugs. That such action was needed to prevent cases of methadon addiction appears from the Public Health Service scientists' report. They gave the drug to former morphine addicts under treatment at the Service's Lexington, Ky., Hospital. Most of these men liked the drug and said its effects were similar to

those of morphine and heroin. Typical comments were:

"This is great stuff. I wouldn't have believed it possible for a synthetic drug to be so like morphine. Can you get it outside? Will it be put under the narcotic laws? I wish I could get some to kick my next habit."

Misuse of benzedrine inhalers to get a kick or a lift is apparently widespread. Drs. R. Monroe of Orangeburg, N. Y., and Hyman J. Drell, of Chicago, found one-fourth of the inmates of the Disciplinary Barracks using these inhalers in this way. More than half of the group had been taking the drug in civilian life.

Benzedrine, or amphetamine, can be habit-forming and can cause convulsions, symptoms of insanity, high blood pressure, and even death. Doctors have long warned against its indiscriminate use and it is listed as a dangerous drug under the federal pure food, drug and cosmetic law. Many states forbid its sale without a prescription.

Benzedrine Inhalers

The inhalers, however, can be bought at every corner drug store. Those who want a benzedrine kick break the inhalers open and chew the paper strip which is impregnated with the drug. Since this method of taking it irritates the inside of the mouth, some soak the paper in coffee or an alcoholic drink to get the drug.

Others chew bits of the paper strips in chewing gum or wrap a moistened strip in cigarette paper and swallow it.

On the paper strip in the inhalers is printed: "Warning: For Inhalation Only! Unfit for Internal Use. Dangerous If Swallowed." But this warning does not seem to stop misuse of the inhalers.

Crazy ideas, hearing voices, acute pain and other abdominal symptoms suggesting appendicitis, were among the symptoms of benzedrine poisoning in the users seen by the two psychiatrists. Chronic cases showed aggressive and rebellious behavior, poor judgment, lack of self-control and loss of sleep, appetite and weight.

Injection of ascorbic acid, or vitamin C, may prove to be a successful treat-

ment for the acute poisoning. Solution of the problem of dangerous misuse of benzedrine inhalers would be development of an inhaler containing a drug effective for clearing stuffy noses that would not be absorbed from the stomach and intestines if swallowed. The present trend toward using chemicals with a local action on the blood vessels of the nose but which do not have much effect on the brain and central nervous system is praised by the psychiatrists as "a step in the right direction."

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Insecticide chemists are trying to develop a method of extracting nicotine from green tobacco plants in order to eliminate the time and trouble of drying them.

SCIENCE NEWS LETTER

Vol. 52 DECEMBER 13, 1947 No. 24

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5 00 a year, two years, \$8 00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566, and 360 N. Michigan Ave., Chicago, STate 4439.

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MEDICINE

Hope To Cure Fatal Tumor

Prospects for cure of a cancer-like disease known as lymphoid tumor are better. May be successfully treated if diagnosed early. X-rays shrink the tumor and relieve pain.

► PROSPECTS for cure of lymphoid tumors, which are a kind of cancer, are better than physicians and X-ray specialists have generally believed, Drs. Hugh F. Hare, William C. Mulray and C. Franklin Sornberger of the Lahey Clinic declared at the meeting in Boston of the Radiological Society of North America.

But the doctors stressed that early diagnosis and treatment are essential for successful treatment.

It untreated, lymphoid tumors invariably kill the patient.

The condition starts insidiously. Enlargement of the lymph nodes, or glands, of the neck are the first symptom. This frequently follows a cold or similar infection, but the swellings do not go down entirely, or may remain the same size. Lymph nodes are found in many parts of the body besides the neck. They occur in the armpits, around the roots of the lungs, around the intestines and in the groins. Any of these may be involved, and the disease may become generalized before the diagnosis of lymphoid tumor is considered.

"Up to the present, our attitude toward the treatment of this disease has been one of looking upon it as hopeless rather than curable," the doctors stated. "This feeling of hopelessness has spread not only to the general practitioner and the laity but also to the specialist.

"Recent reports indicate that a different situation is present. We believe that some of these patients may be cured and many of them lead a happy and healthy life for a period of five years and more."

Of 181 patients seen during the years 1934 to 1942 inclusive, 52, or 29%, were living and well at the end of five years and of 21 patients followed for a 10-year period, 17 remained alive and well.

No other tumor, the doctors said, responds as quickly as lymphoid tumor to X-ray treatment. The X-ray treatment helps shrink the tumor and relieve pain.

Stressing the importance of early diagnosis and X-ray treatment, the doctors pointed to records showing that about 16 months elapsed from the time the disease started to the first treatment. Loss of weight, fatigue, fever, weakness and pain are late, not early, symptoms.

"When it is considered that 50% of patients suffering with this disease are dead within one year following establishment of a diagnosis, it is realized how many patients come for treatment far too late."

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MEDICINE

Control of Bleeding Foreseen with New Methods

► EMERGENCY measures which saved patients who were bleeding to death from the esophagus, or gullet, may give doctors a better way to control this condition, it appears from the report of a group of doctors in the *Journal of the American Medical Association* (Nov. 8).

The condition is a frequent cause of death in patients with cirrhosis of the liver. Known medically as esophageal varicosity, it is like varicose veins in the legs, occurring in veins of the esophagus instead of the legs.

Elevated blood pressure in blood vessels of the liver and spleen produces the swollen veins in the esophagus, which is the food channel leading from the mouth

to the stomach. Until the present, no method has successfully controlled hemorrhage of these distended veins.

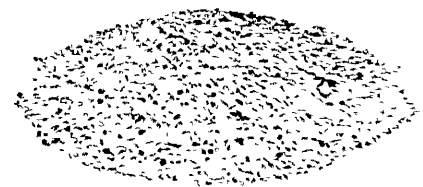
Drs. Max L. Som and John H. Garlock, of Mount Sinai Hospital, New York, discovered that by surgically opening the mediastinum, a membranous cavity situated between the left and right lungs, and packing this area, irritation resulted which established a secondary circulation in new deeper vein channels more capable of carrying the elevated blood pressure.

With this surgical treatment, one patient has been free from bleeding six years and another for 14 months.

Another group of doctors, L. G. Rowntree, E. F. Zimmerman, M. H. Todd and John Ajac of Miami Beach, Fla., saved the life of a patient bleeding to death by devising a latex bag which they inserted into the esophagus and inflated at the site of the hemorrhage. This internal pack was left in place for four days without any discomfort to the patient and completely controlled the bleeding. The patient's health improved and although he had a recurrence of the bleeding within a month, it was immediately controlled by this method.

Success with this patient led the physicians to employ the same method of control on another patient at the Nautilus Hospital of the Veterans' Administration, whose esophagus bleeding could not be stopped by other measures. The tube was again inserted and apparently helped this patient to recovery also.

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CONSERVING GRAIN—Each portion of fish served in place of grain-fed meat saves the equivalent of one pound of wheat as illustrated above. According to the Department of Agriculture it takes the following quantities of grain to make one pound of edible meat: Beef, 2½ pounds; Lamb, 1½ pounds; Pork 5½ pounds; Poultry, 5 pounds.

MEDICINE

Crayons May Hold Danger

The coloring used in some wax crayons may be poisonous when eaten by a child. Most parents and physicians seem unaware of this danger.

➤ WAX crayons, common playthings of most children, are really a greater menace than most parents realize. The case of a little boy who ate two of them, was poisoned, and almost died is reported in the *Journal of the American Medical Association*, (Dec. 6).

Parents, supervisors and doctors believe that no harm will result from eating these crayons, declares Dr. Esther B. Clark of the Palo Alto Clinic of Palo Alto, Calif. She, herself, shared this belief until her experience with this case. The danger, apparently, is that of the coloring matter put into the wax of the crayon becoming converted into an aniline dye in the body with serious if not fatal results.

A two-year-old boy in critical condition was brought to her office. The nurse at the child's nursery school thought he was having a heart attack. He was intensely blue, with nearly black lips. Since a physical examination revealed his heart and lungs to be normal, poisoning was suspected and he was given an X-ray examination which revealed foreign matter in his stomach and intestines. Immediately his stomach was washed out and large quantities of orange and yellow crayon were obtained.

While the wax crayons were being washed out of his stomach and intestines, the boy was in very bad condition; his

skin became cold and damp; he lost his gag reflex; his whole body was a blue-black color and the blood taken for blood count was chocolate brown.

He was then put in an oxygen tent and given a transfusion. In nine hours he showed improvement and by the next morning his color was almost normal, he talked, ate and drank normally, and walked around in his crib.

Dr. Clark points out that both the mother and father had noticed the bluish color of the boy the night before and "his mother tried to wash the blue color off his hands, thinking that it was paint." It was not until late the next morning that illness was suspected.

The physician thinks it significant that although the nurse observed him eating a crayon and scooped it out of his mouth, it "was considered to be so harmless that the fact was not reported, and was brought out only on questioning."

"The use of para red or other coloring material which could possibly be converted into paranitroaniline, or into other aniline dye in the body, should certainly be discontinued in the manufacture of crayons intended to be used by children," Dr. Clark declares. "If their use is to be continued, warning of danger should be placed on the crayons and on the box."

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can usually be fed safely in amounts required without having to compute caloric value.

Women who are to become mothers should be educated to correct attitudes which now make many mothers reluctant to feed their babies. Some of the reasons given for this reluctance are disgust, loss of a good figure, nervousness, fear of getting fat, objections of the husband, shame at having to nurse the baby before the other children, painfulness of the experience or feeling that the routine is too confining.

On the other hand, if the mother is in poor health or is ill, with tuberculosis for example, she should not be allowed to feed her baby. In such instances the infant will get approximately the same amount of gratification and close contact with the mother if properly held during bottle feeding. It is generally believed that infants should not be fed while they are lying on a table or bed, or by means of bottle proppers.

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MEDICINE

Streptomycin May Aid Patients with Vertigo

➤ A NEW use for streptomycin, famous mold chemical which has proved a valuable remedy for many infections, was reported by Dr. Edmund P. Fowler, Jr., of New York at the meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago.

Vertigo is the condition for which Dr. Fowler tried streptomycin, with benefit to some patients. There is a kind of poetic justice in this, since vertigo is one of the unpleasant symptoms that has occasionally afflicted patients getting streptomycin for treatment of some infectious diseases.

Dr. Fowler used the mold chemical for a kind of vertigo typical of middle ear disturbance. Its use for this condition was suggested by Joseph E. Hawkins, Jr., of Merck and Company.

Vertigo is a peculiar and often disabling condition in which the patient feels that the world is revolving around him or that he is revolving in space. It is not the same as the dizziness which is a feeling of unsteadiness and of movement within the head. It may result from disease of the middle ear, Meniere's disease, or organic brain disease.

Dr. Fowler believes streptomycin probably should not be used for any patient with vertigo who is over 50 years old.

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NUTRITION-PSYCHOLOGY

Babies Need Mother's Milk

➤ BREAST-FEEDING for babies now gets an official OK by one of the nation's top scientific bodies, the National Research Council. A report by one of its committees, published in the *Journal of the American Medical Association*, (Dec. 6), states that babies need their mother's milk for its nutritional value and to make them stable emotionally, to give them a feeling of security and to establish normal mother-child relationships.

Dr. C. Anderson Aldrich of the Mayo Clinic is chairman of the committee.

The infant is not the sole beneficiary

of this relationship, for the mother matures physiologically and psychologically by performing her normal maternal duties, the report states. But the committee finds that concrete proof of the psychological value to the mother of feeding her infant is badly needed.

Infants belonging to lower-income families are especially benefited by receiving mothers' milk because they lack the attention of a skilled physician. Human milk prevents or decreases the severity of many intestinal disturbances, is an economical food for infants and

MEDICINE

Conserving Penicillin

Although this mold remedy is in tight supply, the shortage is described as "not serious" because substitutes can be used and doses can be decreased.

➤ YOU do not have to worry about the penicillin shortage if you or one of your relatives or friends gets sick

The famous mold remedy for many serious germ diseases is in very tight supply but the shortage is described as "not serious," by Dr. Henry Welch of the U. S. Food and Drug Administration's penicillin division.

Penicillin can be conserved by using smaller doses and by using two sulfa drugs, sulfamerazine and sulfadiazine, Dr. Perrin Long, professor of preventive medicine at Johns Hopkins University, states.

Penicillin production has been averaging three thousand billion units a month, Dr. Welch reports, but even though manufacturers are producing more than ever before, they cannot keep up with the demand, which is greater than ever before. Dr. Welch says he has not heard of anyone having to go without penicillin, but that many hospitals have not been able to buy all they wanted.

The shortage of penicillin is due somewhat to the fact that doctors are now using it in more adequate dosage, Dr. Welch says.

In many cases they are giving more than necessary, Dr. Long finds. Dosages of penicillin were stepped up to 40,000 and 100,000 units about 18 months ago. This was the same time when much penicillin K was getting on the market. K turned out to be relatively ineffective and manufacturers went back to producing penicillin that is predominantly G. This penicillin is effective in most cases in dosages of 25,000 units, Dr. Long states. In some diseases, such as the heart disease known as subacute bacterial endocarditis, larger doses are needed.

A good deal of penicillin is wasted, or "goes down the sink," as Dr. Long puts it, in preparations made to be given by mouth. It takes five times as much penicillin per dose for effective treatment with these preparations for taking by mouth, though of course they are easier to take and give than the penicillin that must be injected with hypodermic needle.

Streptomycin, mold remedy that is penicillin's ally, is being produced in adequate amounts, Dr. Welch reports, and can be used instead of penicillin in some conditions.

For most streptococcus infections, sulfadiazine and sulfamerazine can be used instead of penicillin, Dr. Long points out. For meningitis due to the germ called meningococcus, he says, there is nothing to show that penicillin is any better than these sulfa drugs.

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CHEMISTRY

New Cheap Resin Alcohol Being Produced from Rosin

➤ A NEW low-cost resin alcohol from rosin from American pine trees of the South is now commercially produced, Hercules Powder Company revealed. It is a chemical which has wide potential uses in industries ranging from textile to varnish making.

The new product is called hydroabietyl alcohol. It is the first commercially available primary alcohol to be developed from rosin. It is a viscous liquid at room temperature and is colorless. Unlike most commonly used alcohols, it

does not mix with water.

Valuable products that may be derived from hydroabietyl alcohol are resins, foamers, detergents, wetting agents, plasticizers, corrosion inhibitors, antioxidants, parasiticides, bactericides, and compounds highly stable to ultraviolet light. The alcohol will find uses in such industries as textile, rubber, adhesive, detergent, paint, varnish and lacquer.

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ENGINEERING

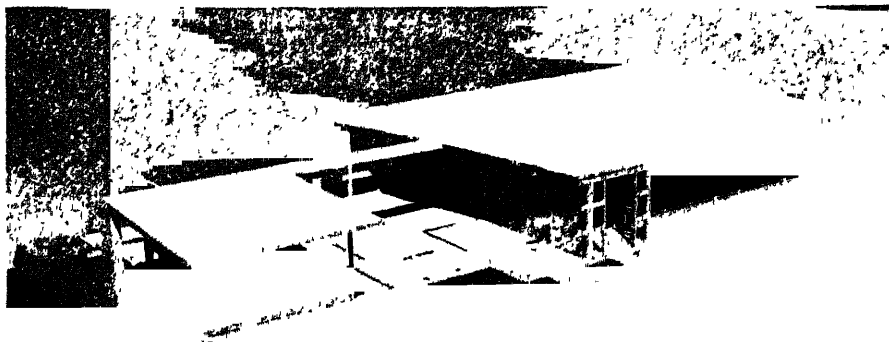
Hurricane-Proof Houses Constructed on Guam

➤ HURRICANE-proof houses of precast concrete are under construction at Guam island in the western Pacific for use by Navy island-based families.

They are designed to resist earthquakes, fire, insects and rodents. Materials for the houses are shipped to the island in bulk, and the wall and roof panels are molded, finished, surface-treated and cured where they are cast. The parts are then taken to the home site and erected on a concrete foundation and floor already laid.

Instead of windows, the buildings have screened door-like openings on three sides, all equipped with Venetian blinds. This permits ventilation, an essential in Guam's hot climate. Inside partitions are plywood. Kitchen and bathrooms are completely modern, and all services are electric. The wide overhanging roof, to give protection against hot sun and heavy tropical rains, is of built-up asbestos for insulation.

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HURRICANE-PROOF HOME—This is an incompleted model of the precast concrete homes under construction at Guam island for use by families of Naval personnel. They are designed to resist earthquakes, fire, insects and rodents.

MEDICINE-BACTERIOLOGY

Germs from the Sea May Aid Cancer Fight

➤ GERMS from the sea may become future weapons against cancer. This possibility is suggested by Drs. Frederick D. Sisler and Claude E. ZoBell, of the Scripps Institution of Oceanography, in a report to the journal, *Science*, (Nov. 28).

So far, it is only a possibility and one which cancer researchers and other medical scientists will have to investigate further. The California scientists got the idea in the course of a survey of the part bacteria play in decomposing petroleum hydrocarbons and chemically related compounds.

Some of the petroleum hydrocarbons have long been known as chemicals that could cause cancer in experimental animals, and, in some cases, in man. Chimney-sweeps' cancer is an example of a human cancer which was due to the irritating action of coal tar chemicals in soot in chimneys.

Cancer-causing petroleum hydrocarbons are among the chemicals which marine bacteria can decompose, the California scientists found. The bacteria, like other bacteria from the sea and the soil and some molds and yeasts, use the coal tars as a source of energy.

The action of the bacteria in breaking down hydrocarbons to get energy might be applied, the California scientists suggest, to the prevention or treatment of cancer.

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CHEMISTRY

New Powerful Insecticide Makes Chickens Inedible

➤ BENZENE HEXACHLORIDE, though a powerful insecticide, is not good for use around chickens, warn Prof. Ephraim Hixson and Dr. Martin H. Muma in *Science*, (Oct. 31). Their flesh will become so ill-flavored as to be inedible if the compound is sprayed on the birds themselves or on the walls of their house, or if it gets into their food.

The two men kept chickens in contact with benzene hexachloride in all three ways last summer. The chickens themselves apparently didn't like the taste of the insecticide, for when some of them were offered grain on which it had been sprayed they preferred starva-

After groups of chickens had been exposed for periods of from two to ten weeks, they were killed and cooked; then their meat was sampled for odor and taste. They were all noticeably tainted.

Since benzene hexachloride, known also as Gammexane and 666, has been used in poultrymen's insecticide mixtures by some manufacturers, Prof. Hixson and Dr. Muma consider a warning to be called for.

But this "socially impossible" insecticide has had its handicap turned into an advantage in at least one case, U. S. Department of Agriculture scientists report.

Benzene hexachloride has been used effectively against a highly specialized cattle parasite in the Southwest, a tick that attacks only the insides of the animals' ears.

Pine oil containing from three to five percent of benzene hexachloride, when squirted into cows' ears, not only kills the ticks already present but serves as a repellant to hold new attackers at bay for at least 17 days. Counting both killing and repellant action, one dose "deticks" a cow for about a month, at the cost of one cent per ear.

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ENGINEERING

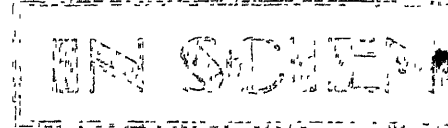
Giant Harbor Dredge Will Remove 6,000 Tons an Hour

➤ A GIANT dredge to maintain sea approaches to New York harbor will soon be in operation. It is an ocean-going dredge with a capacity of sucking up 6,000 tons of dirt and muck from ship channel beds every hour.

The new dredge, especially designed for the New York harbor, is the latest weapon in the U. S. Corps of Engineers' constant battle to keep harbors and approaches navigable. The dredge is a product of Sun Shipbuilding and Dry Dock Company, Chester, Pa. All steam and electrical equipment were built by Westinghouse. It is a twin-screw turbine-electric vessel, propelled by two 4,000-horsepower motors.

For dredging, it has two giant swivel-jointed steel tubes 100 feet long projecting from the sides of the vessel. In action these are lowered until their mouths drag along the bottom of the channel. Then, two 1850-horsepower pump motors go into action, sucking up 100 tons of mud per minute.

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BIOPHYSICS

Roses and Rats to Show Radioactive Effects

➤ ROSES and rats will be used in demonstrating biologic effects of radioactive elements, at a conference on the use of radioactive isotopes in agricultural research, to be held at the Alabama Polytechnic Institute Dec. 18 through 20.

Dr. Ralph T. Overman of the Clinton National Laboratory at Oak Ridge, Tenn., stated that he will immerse a rose branch with one open flower and one bud in a solution of radioactive phosphorus, and after a time measure the radioactivity in various parts of the plant. From past experience, it is expected that the bud will show the greatest intensity of radioactivity.

White rats will be used to show how various elements and compounds "tagged" with radioactivity travel through the animal body and become concentrated in particular organs. A familiar example is the rapid accumulation of radioactive iodine in the thyroid gland, making the rat's throat region the most active when tested with detecting instruments. Another is the absorption of radioactive potassium into the red cells of the blood.

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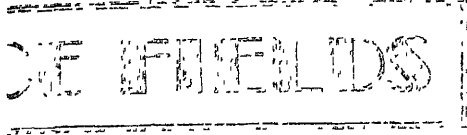
ELECTRONICS

Radar Users in Colleges Need Government License

➤ RADAR users in training courses in college laboratories have received a note of warning from the Federal Communications Commission. Both station and operator licenses must be obtained from the government before starting to use the equipment. This precaution is to prevent interference with the transmitters of recognized radio services.

Most of the radar equipment in use in college training courses was obtained from surplus army stocks. It is used primarily in training engineering students on radar techniques. The Commission realizes the need for such training but does not intend to let student equipment interfere with established radio services, particularly radio and radar navigational aids.

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NUTRITION

Potatoes Top Vegetable, Year's Survey Discloses

➤ AMERICANS in general are still "meat and potato" people, a survey made by New York's state college of agriculture at Cornell University indicates.

The survey was made of vegetable purchases in the course of a year at three stores. Potatoes accounted for more than 42% of the 1,500,000 pounds.

Forty-six different vegetables were included, with lettuce ranking as a poor second to potatoes in popularity. Out of every 100 pounds of vegetables, seven and a half pounds were lettuce, six were dry onions and celery, cabbage and carrots each claimed five pounds.

Potatoes also cost the most money in the vegetable budget, with tomatoes ranking second.

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ARCHAEOLOGY

Remains of Indian Life at Site of New Reservoirs

➤ ARCHAEOLOGISTS, racing against time in areas to be flooded for dam construction projects, this summer located more than 500 sites of Indian life which will be underwater in new reservoirs in the Missouri basin.

The survey of Indian sites in the basin was conducted by the River Basin Surveys of the Smithsonian Institution under the field direction of Dr. Waldo R. Wedel of the U. S. National Museum, with Dr. Frank H. H. Roberts, Jr., associate chief of the Bureau of American Ethnology, directing the entire project. Cooperating in the preflooding archaeological studies are the Bureau of Reclamation, National Park Service and the Corps of Engineers of the Department of the Army.

Plans call for the most important of the sites to be excavated for detailed study before the man-made flood is set loose.

Remains of at least a thousand years of human life have been discovered in 93 Indian sites recorded where Fort Randall Reservoir will be located in South Dakota.

Perhaps ten times as ancient remains may be scheduled for flooding in areas in Montana and Wyoming, the survey

indicated. Other remains, of a time before the Indians learned the art of pottery, were found in the Garrison reservoir area in North Dakota and in Nebraska at the proposed site of the Medicine Creek reservoir.

Construction is already underway at the Bald Hill reservoir on the Sheyenne river in North Dakota. This area has been identified as being on the path followed by ancient immigrants coming into the great plains from the eastern woodlands.

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METALLURGY

Metal Bars Tested By Magnetic Comparison

➤ WHETHER a metal rod containing iron in a stock pile is identical with a standard specimen in composition and characteristics can be determined by a simple instrument that compares their electrical or magnetic quantities, the Instrument Society of America was told by D. E. Bovey of the General Electric Company.

The instrument, a war development with improvements, is called a metals comparator. It is relatively small and inexpensive, and so simple to operate that it can be used for inspection in stock rooms or on a production line. Its use in no way injures the metal being tested.

The comparator consists of a solenoid, a coil of wire through which an electric current is passed to create a magnetic field, which forms one leg of a balanced circuit. The other leg is a variable resistance that can be changed until the circuits from the two legs are in balance. In use, the standard specimen is inserted in the solenoid first and a balance obtained. Then the rod of unknown properties is inserted in the coil. If the balance holds, it is identical with the specimen in composition and characteristics. In searching the stockpile for an identical metal, one rod after another is tested, until one is found that holds the balance. Rods can be used as fast as they can be inserted in the solenoid.

The instrument has been used to differentiate between annealed and unannealed steel bars. It has also been used to sort finished metal parts, including plated parts, on the basis of composition or heat treatment. Ferrous metals can be assorted on the basis of average hardness. Materials or parts to be tested need not be wiped, cleaned or otherwise specially prepared.

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PALEONTOLOGY

Story of Ancient Animals Learned from Skeletons

➤ LEARNING what the lobster's oldest uncles were like by studying their cast-off garments is the task to which a leading English scientist, Dr. H. B. Whittington of the University of Birmingham, devoted himself at the U. S. National Museum in Washington.

The animals are trilobites, creatures that dominated earth's primal seas a half-billion years ago. They had jointed outside skeletons, like present-day lobsters and shrimp; though their kinship to modern crustaceans is extremely distant. They have, as a matter of fact, no direct descendants and no really near relatives.

Dr. Whittington was in Washington to study them partly because the Shenandoah valley, not far from there, is one of the world's best hunting grounds for trilobite fossils. There they can be found in all sizes and stages of development—for they shed their outer crusts from time to time as they grew, just as present-day lobsters and crabs do. It thus becomes possible to work out a trilobite life-cycle, from infancy to full growth, by examining series of these shed shells, just as you could tell a good deal about a long-departed great-uncle if you found a chest full of the clothes he had worn from the time he was seven until he was seventy.

The fossils in the Shenandoah valley belong to the heyday of the trilobites, when they were the highest form of life on earth. That was about 400,000,000 years ago, in the Ordovician geologic age. These were not the earliest trilobites, however. More primitive forms at least 100,000,000 years older are known; and it is practically certain that there were others, as yet undiscovered, much older than that, for these earliest ones, of Cambrian age, were already quite diversified and highly evolved.

Science News Letter, December 13, 1947

ENGINEERING

Coal Is Made Dust-Free By Coating with Asphalt

➤ COAL is made dust-free by coating with asphalt from a colloidal suspension in water, in the process on which patent 2,431,891 was granted to C. R. Rosencrans of Pittsburg, Kans. All grades of coal, from anthracite through bituminous to lignite, can be thus protected, the inventor states.

Science News Letter, December 13, 1947

BOTANY

Know Your Christmas Tree

The most popular and most widely marketed are the spruces, Douglas and fir trees, which are of the single-needle class. The needles reveal the type of tree.

By DR. FRANK THONE

See Front Cover

► CHRISTMAS trees are beginning to appear in the markets. Within the coming fortnight every city in the land will be invaded by a forest of little evergreens, which on Christmas Eve will blossom with lights and bear strange but appetizing fruit of gifts and goodies.

Almost as varied as the ornaments that deck their branches are the little trees themselves. Almost every part of the country where trees grow at all produces its own local Christmas-tree species, and in addition there are a few kinds so abundant and so widely used that they can almost be looked upon as "standard" Christmas trees. You don't have to have a Ph.D. in botany to know your Christmas tree; a very few easy identification characters will usually give you its name.

Formation of Needles

First thing to look for is whether the needles are borne singly, or two or more in a cluster. By far the greater part of the trees that come to market, especially if they come from a distance, are of the single-needle class—either spruce, or Douglas, or fir. Trees of this group are popular because their foliage is dense and glossy green, and because it sticks to the twigs longer than the needles of most other conifers.

Spruces are probably still the most widely used of the Yuletide trees. They are easily identifiable: their needles are short (one-half to three-quarters of an inch) and very stiff and sharp-pointed, and they stick out at all angles to the twigs. Each needle stands on a tiny raised place, that remains as a prickly when it falls off. Sometimes even small trees have cones; these are thin-scaled, and hang down.

Firs are cousins of spruces. They make the most beautiful of all Christmas trees, but are far less frequently met on the market. Their needles are usually longer than those of the spruces; they are much softer, do not have sharp points, and are

frequently curved. Although they spring from all sides of the twig, their bases bend around in such a way as to give them a two-ranked appearance. Their cones, when they have them, are like thick candles that stand straight up, instead of hanging down like those of the spruces.

Douglas, which is a kind of intermediate between spruces and firs, is a botanical orphan. It has been called Douglas spruce and Douglas fir, and its lumber has sometimes been sold under the name of Douglas pine. Its technical name, *Pseudotsuga*, is a hybrid word (half Greek, half Japanese!) that means false hemlock. Yet the tree is neither spruce, fir, pine nor hemlock.

Douglas Cones Unique

Despite the hardships of being a botanical Cinderella, the Douglas makes a fine Christmas tree. So much so, that although it is native only to the northwestern states, it is now sold in Eastern markets in competition with spruces. It has sharp-pointed needles, but they are less stiff than those of spruces, yet stiffer than those of the firs. Its cones are absolutely unique: from between each pair of scales springs a narrow, three-pointed appendage.

These, then, are the most popular, most widely sold Christmas trees. They are often hauled hundreds of miles to market, and Christmas-tree farms where they are raised especially for the holiday trade are becoming increasingly numerous. The plantings set out by the late President Roosevelt at Hyde Park constitute perhaps the best-known farm of that sort, though by no means the largest one.

Most Christmas trees, however, are not farm-grown, but represent thinnings in natural or planted forests, where part of the young trees have to be taken out to give the rest a chance to grow into usable sizes. The Yuletide market offers an opportunity to help pay for the labor of thinning.

In addition to this relatively small group of what might be termed "national" Christmas trees, there are

many others that are harvested locally. One of the most widespread of these is another misnamed tree; a juniper that is usually called red cedar or Virginia cedar. It is a peculiar conifer in that its cones have evolved into fleshy berries, with a strong resinous flavor. Red cedar is an attractive tree and is used a good deal for holiday purposes. It would be more popular but for an unfortunate, messy habit of shedding its needles early and copiously.

Close Cousin of Red Cedar

A fairly close cousin of the red cedar is arbor-vitae. This tree is also a berry-bearing conifer; its leaves are not even needles, but have become small, scale-like affairs so closely pressed against the finely-branched twigs that they present an almost fern-like appearance. It is not as well shaped for Christmas-tree purposes as other trees, having a tall, slender, columnar growth habit. Nevertheless it is sometimes used.

All the conifers thus far discussed are of the single-leaved type. Contrasted with them is the one large group that has its needles in pairs or clusters, the pines. Even the shortest of pine needles are longer than those of the spruce-fir



HARVESTED LOCALLY—This red cedar makes an attractive Yuletide tree, but because of an unfortunate, messy habit of shedding its needles early and copiously, it is not widely marketed.



MOST WIDELY USED—This spruce owes its popularity to the fact that its foliage is dense and glossy green and it sticks to the twigs longer than the needles of most other conifers.

group; pine needles are almost never less than two inches long, and in a few noble species they may be as much as a foot in length. Moreover, their cones have thick, heavy scales instead of the thin scales found in the spruce-fir group. There should be no mistaking a pine, if that is your Christmas tree.

Practically all little pines found on the holiday market are cut near the places where they are sold. They do not command as high prices as spruce or Douglas, so long hauls are usually uneconomic for them. All the Eastern states, and most of the Southern and Midwestern states east of the Mississippi, have one or more kinds of pines that spring up thickly in cut-over or burned-over timberlands and take possession of abandoned farms. Two common names, slash pine and old-field pine, are testimony to this habit.

Considered as Weeds

Since most landowners tend to regard such pines as nothing more than mere wooden weeds, they will let harvesters for the Christmas market take truckloads of them for next to nothing, and are very apt to let the individual householder out for a week-end drive help himself to a tree for nothing, if he will haul it away in his luggage-rack. Despite the low esteem in which little pines are often held, they do make attractive Christmas trees.

No matter what kind of tree you buy, or go out into the country and harvest for yourself, you can prolong its useful life and postpone the ill day when it sheds its needles, by setting its cut stem in a container of water. Various sprays have been tried for helping keep foliage on Christmas trees, but just giving them water, as if they were cut flowers, is the treatment recommended by the U. S. Department of Agriculture.

When you get your tree home, saw about three inches off the bottom of the trunk. This will remove the part of the water-conveying system that has become clogged with air bubbles until it will no longer function. Have a can or larger container of water ready, where you intend to set your tree.

Better guard against skidding by securing small blocks around the can with nails into the floor, or some such device. Set the cut end of the trunk into the water as quickly as possible then arrange such braces and guy-wires as will be needed to hold the tree erect. Add fresh water to the supply in the can as needed. This will materially prolong the useful life of your Christmas tree.

Science News Letter, December 13, 1947

CHEMISTRY

Luminous Paints Add to Christmas Tree's Beauty

► ORNAMENTS, light bulbs and even the needles and branches of the Christmas tree will continue to glow long after all other illumination has been turned off if a little time is taken to add daubs of luminous paint. Many broken ornaments can be put to use again and unusual decorations are made possible by the same method.

Luminous paints are available in prepared forms already mixed in a liquid vehicle. Or they may be prepared by mixing the powder, sometimes found in educational kits, in a clear lacquer, shellac or mucilage. The powder also may be applied as a dust to a surface treated to make it temporarily sticky.

If you get the luminous material in powdered form it is a good idea to prepare about two ounces of each of the following adhesives. Make a celluloid cement by cutting clear, discarded photo film into tiny slivers about a sixteenth inch wide and an inch or so long, and drop them into acetone. Cutting into tiny slivers expedites solution which will occur in a day or two if left standing. Be sure to cork the bottle.

The thin, syrupy liquid is to be used as a "stickum" for glass and metal articles. It should not be used on tree branches. For the second solution thin ordinary mucilage by adding about half of its bulk of clean water. For the third, use a thin dilution of ordinary household shellac, diluting with denatured alcohol until you get a free-flowing liquid.

Test Surface Coating

Before decorating any ornament test it for fastness of the surface coating. Apply a tiny drop of one of the adhesives near the top of the ornament. Let stand for a fraction of a minute, then wipe it off. If the color comes off try one of the other adhesives. Use the solution on the ornament which causes the least damage. On any ornaments which have seen their better days it will not matter much if color runs. You will be coating them all over, anyway.

Having established which solutions you will use with the respective ornaments, either dip the article into the adhesive or apply the adhesive with a brush, making designs, sketches, or write across the object in bold script. As soon as the material becomes tacky, sprinkle the surface with the luminous powder or dip and roll in a box of the chemical. Such a surface layer gives the most economical and effective use of the powder.

Or the luminous powder can be mixed with the adhesives mentioned to make a paint which can be handled the same as the bottled products obtained from the hardware, paint or auto supply stores.

For making the tree glow in the

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Do You Know?

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An outstanding preservative for wood is a chemical known as *pentachlorophenol*; it is deadly to termites and fungi.

New *papers* that retain strength even when soaked with water are used to wrap moist fresh vegetables during shipment to market; they keep them in good condition.

The greatest differences between day and night temperatures in the United States usually come at the time of the *equinoxes* in March and September, when days and nights are about equal in length.

Channel *catfish* of Midwestern rivers feed largely at night, with the heaviest period coming at dusk; feeding during the twilight hours is largely in deep water, but later the catfish come near the river banks.



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dark, use the thinned mucilage. Apply to a few branches at a time with a spray gun, an insect spray, window washing spray or a blow spray. When the material is tacky, hold a sheet of paper under the branches to catch any loose powder and sprinkle, preferably through a strainer. Shake the branch to knock off any material not bound and use for the next location. This procedure will permit you to spread a small vial of powder over a large surface.

Treat the electric tree lamps in the same fashion as the other decorations. Bear in mind that to get a good glow the surface should be well covered with the luminous materials. A single layer is as effective as multiple coats. Only the surface layer gives off light. Remember, also, that a coated ornament loses its original brilliance and color. So use discretion if you want to get the most spectacular effect.

Holes in broken ornaments may be patched with strips of Scotch tape and

the entire ornament may then be covered with the luminous material thus returning a worthless article to decorative value. Dry pine cones, grasses, straw flowers and paper cut-outs, fitted with wires for hanging and treated with the paint will add to the decorative scheme.

Apply maximum illumination by substituting light colors in those bulbs which illuminate the tree. Locate these where you have the greatest number of treated ornaments or branches. Then, when the lights go out, you will have something of which you will be justly proud.

Science News Letter, December 13, 1947

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MEDICINE

Checks Incurable Disease

➤ ONE of the nitrogen mustards, war gas chemical, has brought some improvement to four veterans suffering from an incurable chronic disease known as Boeck's sarcoid. Dr. George E. Snider of the Veterans Administration Hospital at Fort Howard, Md., reported to the Southern Medical Association meeting in Baltimore.

The swelling of the glands went down, the acute inflammation of the iris of the eyes subsided and in some cases vision improved, chest symptoms were arrested, the skin eruption receded, and some patients gained weight.

In one patient, treated almost a year ago, the disease has almost completely disappeared.

The nitrogen mustard which brought this improvement cannot yet be called a cure for the condition, Dr. Snider emphasized. Patients with Boeck's sarcoid often have periods when they seem to be getting better, so more time must elapse before doctors can be sure the improvement in these four cases was due to the new treatment.

The chemical was given by injecting a dose into the veins every day for four days, allowing a rest period of about a month, and then giving a second series of injections. Nausea and vomiting followed each injection and the number of

white blood cells was temporarily reduced.

Boeck's sarcoid, a rather rare condition, is considered an infectious disease, although no germ or virus cause has been found. Cough, shortness of breath and a little fever may occur in some cases and suggest that the patient has tuberculosis. Swollen lymph glands and salivary glands, inflammation of the iris of the eye, and a skin eruption that is painless and does not itch are other symptoms. In the early stages, the patient may not have fever but feels mildly sick with a distaste for food and vague digestive disturbances.

Almost any part of the body may be affected. Physicians have generally called Boeck's sarcoid a benign, meaning harmless, sickness. More recently they have realized that it may at times involve vital centers and lead to serious damage and even death.

Arsenic, gold, X-rays, radium, ultraviolet light and many other kinds of treatment have been tried without success.

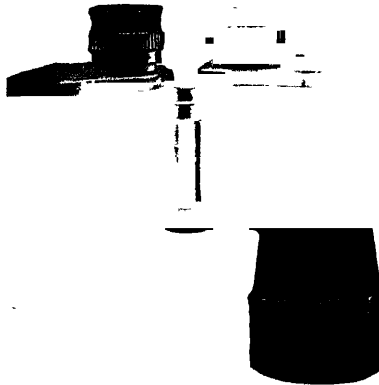
Dr. Snider was led to try nitrogen mustard because this war gas chemical had brought improvement in cases of Hodgkins' disease, which has some similarity to Boeck's sarcoid.

Science News Letter, December 13, 1947

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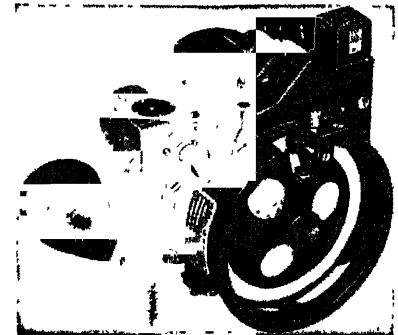
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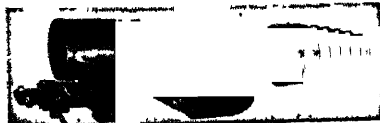
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BOTANY

NATURE RAMBLINGS

by Frank Thorne



Is Holly Holy?

➤ HOLLY has been associated with the Feast of the Nativity for so many Christian generations that we have a tendency to ascribe a kind of holiness to the shrub itself. Indeed, its name is spelled "holy" in the first known written record in English, which dates from the middle of the twelfth century.

This, however, must be taken as simple coincidence, for "holy" and "holly" are really two quite distinct words, deriving from roots in the same early European language. "Holy" originally denoted wholeness, soundness, integrity. "Holly," despite its naive early spelling, comes

from "holen," which was the Anglo-Saxon name for the shrub itself, and has no religious or moral significance at all. Holly is still called "hollun" in the lowland Scots dialect. Another medieval spelling for holly was "hooley"—but that must not be taken as indicating a possible Irish source! The modern Irish word for holly is "cuilen," pronounced (approximately) "killen"; language students state that it comes from the same basic root-word as the Anglo-Saxon "holen."

Most of the holly offered in the holiday market in this country is the native American species, gathered wild in our woods. This is a pity, for harvesting methods are exceedingly crude and destructive, so that holly trees and bushes are becoming increasingly scarce in the neighborhood of cities in our eastern states. The situation has become so bad that in some states the unauthorized gathering of wild holly is forbidden by law, though enforcement of the statutes is rather uneven.

European holly, raised mostly in the Pacific Northwest, is also obtainable, though naturally at higher prices than the plundered native species. It is distinguished by the glossier sheen of its leaves, which are usually also more prickly than those of the American holly, and by its larger, brighter red berries. Some people buy little holly bushes and

keep them growing the year round.

Holly is used to a considerable extent, in the parts of the country where it will grow, as a yard shrub and especially for hedges. Since holly flowers have distinct sexes, borne on different bushes or trees, it is important when planting it to make sure that your stock is the female or berry-producing kind. It used to be necessary to plant one male bush for every dozen or so female specimens, to insure berry-bearing through pollination. However, this is no longer necessary, since some of the recently discovered synthetic growth-control chemicals will cause unpollinated female flowers to develop berries.

Science News Letter, December 13, 1947

GEOGRAPHY

Atomic Proving Grounds in Pacific Resembles Bikini

➤ ENIWETOK atoll, designated by the Atomic Energy Commission as permanent mid-Pacific proving ground for atomic weapons, is excellently adapted for the purpose. Westernmost of the Marshall group, it is a couple of hundred miles due west of Bikini and about twice that distance northwest of Kwajalein; thus well isolated both for security purposes and for safety of other atolls from harmful by-products of atom-bomb explosions.

It resembles Bikini in both size and shape of its lagoon, which is roughly elliptical, with its greater axis about 20 miles in length and its shorter axis about 15. There is thus ample anchorage for all naval, auxiliary and target craft that may be needed. There is an excellent deep-water entrance—so good, indeed, that when the American amphibious attack was staged in mid-February of 1944, the whole convoy steamed right into the lagoon, with warships blasting Jap batteries into silence as they passed through the channel.

Although major air traffic will doubtless continue to make most use of the Pacific crossroads at Kwajalein, it is possible to land even large planes at Eniwetok. Even in war days, the Japs had a 4,000-foot airstrip, and this has been much improved. The Atomic Energy Commission statement indicates that there is more land surface here than at Bikini, which will make for more comfortable elbow-room, both for airplane landings and the setting up of test instruments.

Science News Letter, December 13, 1947

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Science News Letter, December 13, 1947

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☼ **HAIRBRUSH** is slotted between the rows of bristles so that soap and water can be run through the brush to lessen the time ordinarily required for cleaning. The back and handle are made of a plastic that can be colored in various hues.

Science News Letter, December 13, 1947

☼ **GUIDE MAPS** on the walls of New York subway stations are made of plastic and need no frames or glass covers. The hard, tough plastic used is unharmed by heat, water, oil, or even by alcohol or lipsticks. Colors do not fade or discolor, and the surface is easily cleaned.

Science News Letter, December 13, 1947

☼ **COLD CHAMBER**, which liquefies helium gas and can maintain a temperature of 456 degrees below zero Fahrenheit, almost absolute zero, is now being regularly produced, following a few experimental models now in laboratory use. It includes a heat exchanger which cools compressed helium to a liquid, and an expansion engine originally developed for oxygen generation.

Science News Letter, December 13, 1947

☼ **PHOTOELECTRIC EYE DEVICE**, inexpensive type for use in homes, will close a window when it rains, turn on lights when darkness approaches, open garage doors when car lights strike it, and perform automatically other jobs. It must be used, of course, with suitable operating mechanisms.

Science News Letter, December 13, 1947

☼ **TICKET MACHINE** prints, prices



and issues a ticket to a passenger in an airplane station in less than five seconds. The machine in the picture, in a New York terminal, can issue tickets to cover at least 85% of the demands of travelers passing through the station.

Science News Letter, December 13, 1947

☼ **SELF-LIFTING FLATIRON** has a single leg which retracts into the sole of the iron when it is in use, but otherwise projects at an angle to hold the iron on its heel with the heated surface away from the ironing-board. This self-lifting operation permits sit-down ironing.

Science News Letter, December 13, 1947

☼ **FRITTED GLASSWARE** in the form of disks is for use in laboratories as filters to replace asbestos, which was di-

verted to other uses during the war. It is a hybrid of the glass family, employed for other purposes for several decades, and is described as a glass that leaks.

Science News Letter, December 13, 1947

☼ **ELECTRIC APPLIANCE TESTER**, designed particularly for repair men, will show the condition of any common electrical appliance, checking open circuits, continuity, grounds, short circuits, insulation leakage in wiring systems. This portable instrument has an AC ammeter range up to 15 amperes.

Science News Letter, December 13, 1947

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Question Box

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NUTRITION-PSYCHOLOGY

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SCIENCE NEWS LETTER



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A SCIENCE SERVICE PUBLICATION

MINERALOGY

Man - Made Minerals

Are artificially produced in the laboratory by subjecting ingredients of natural minerals to the pressures and temperatures under which they form in the earth.

➤ SCIENTISTS have borrowed Nature's recipe book to make several minerals in the laboratory under the pressures and temperatures at which these minerals were produced in the earth.

Talc, the stuff that is the base of face powders and has countless other uses, was produced from its ingredients—magnesia, silica and water—in the Geophysical Laboratory of the Carnegie Institution of Washington. Drs. N. L. Bowen and O. F. Tuttle, who performed the experimental work, put a magnesium silicate, serpentine, under high water vapor pressure to produce talc.

Pressures and temperatures required to form the mineral indicated that natural talc is produced in the earth under four to five miles of impervious rock. Other natural minerals made up of magnesia, silica and water which were produced by the Carnegie Institution scientists include the olivine minerals,

torsterite and enstatite.

From this research program, disclosed in the annual report of the institution, scientists may be able to learn how natural minerals found in the earth's rocks were originally formed.

To form the minerals, the natural ingredients were put in a new, and as yet nameless, type of pressure apparatus. It is a small, stainless steel cylinder, about half the size of a lipstick container. Talc was produced in the tiny pressure device at a temperature of nearly 1,300 degrees Fahrenheit, under a pressure of 30,000 pounds per square inch. Temperatures up to 1,652 degrees Fahrenheit have been produced in the cylinder.

Other studies with the new apparatus include experiments with potassium, aluminum, silicates and granite and water.

Science News Letter, December 20, 1947

ASTRONOMY

Find Clue to Star's Speed

Strong magnetic fields, observed for the first time in stars other than the sun, may hold the key to the speed of their rotation.

➤ THE key to the speed with which distant stars are whirling may lie in the strength of their magnetic fields. Stars possessing strong magnetic fields are rotating rapidly, the research of Dr. Horace Babcock of Mount Wilson Observatory of the Carnegie Institution of Washington indicates.

For years scientists have been searching for a clue that would show them how fast a far-off star, with its axis pointing toward the earth, is twirling. In the star's magnetic field, Dr. Babcock's work suggests, lies the answer.

For the sun, the magnetic field strength is about 50 gauss and the sun's equator is known to rotate at a speed of approximately 1.25 miles a second. Early-type stars believed to rotate at exceptionally high speeds were investigated. Magnetic fields stronger than

1,000 gauss were found in several and a polar field of some 5,500 gauss was discovered in one. If Dr. Babcock's theory is correct, this star must be rotating at a terrific speed.

For several decades local magnetic fields of 5,500 gauss have been measured in sunspots, showing the fury of their activity. Dr. Babcock's investigation, however, represents the first observation of magnetic fields in stars other than our sun.

The discovery of magnetism in rapidly rotating stars may contribute greatly to our knowledge of the relationship between the magnetic and mechanical properties of large rotating masses, such as stars. It may also aid our understanding of rotating stellar systems such as the galaxy of which the earth is a part.

The controlling effect exerted by the

magnetic field of a rotating star on ions and electrons in and beyond its atmosphere may well explain the existence of equatorial rings of tenuous material found around some stars and planets. It may point the way to more complete theories of how planetary systems and double stars are created.

Science News Letter, December 20, 1947

EMBRYOLOGY

Newborn Baby Almost Three-Fourths Water

➤ THE newborn baby is almost three-fourths (74.6%) water. A little more than half (56.5%) of this water is in his blood and in the cells that make up his body. The rest is in the fluid lying between and about the cells and in the body spaces. But as he grows the proportion of water within the cells gets larger.

Salt, tagged with radioactive sodium, and heavy water led to these discoveries in studies by Dr. Louis Flexner and associates at the embryology department of the Carnegie Institution of Washington.

These are the first such studies made on newborn babies, though a number have been made on grown persons.

The radioactive salt, which was too slightly radioactive to cause any damage to the baby, was dissolved in water containing deuterium oxide, or heavy water. This was injected into one of the baby's veins. Two and one-half to three hours later a sample of blood was drawn from a vein. This interval was known to be long enough for the water and salt to be thoroughly distributed throughout the body.

The heavy water goes everywhere in the body along with ordinary water. The salt goes into all the fluid outside the cells but not into the cells. Having a larger space to fill than the salt, more of the water, proportionately, than the salt leaves the blood.

So the blood sample after three hours has lost more of the heavy water than of the tagged salt. The difference tells what proportion of the water has gone into the cells. The degree to which the heavy water in the blood becomes diluted with ordinary water, exchanging with it from the body tissues, tells how much of the body is water.

Dr. Flexner's findings, made on healthy, living infants, agree with those of other scientists made on stillborn babies by other methods.

Science News Letter, December 20, 1947

MEDICINE

Sex Hormone for Cancer

New treatment of the disease is going to be tried in cancer clinics throughout the country under A.M.A. sponsorship. Still in experimental stage.

► A NEW way of treating cancer is going to be tried on a large scale by cancer clinics all over the country under the auspices of a special committee of the American Medical Association.

The treatment consists in the use of sex hormones. Several hundred patients with advanced cancer of the breast have already been treated with female sex hormones. Several score with cancer that spread to the bones from the breast have been treated with male hormone. And men with cancer of the prostate gland have been helped by castration and by treatment with female sex hormones.

The hormone treatment of breast cancer has not yet shown signs of being a cure. But in some cases it relieves symptoms and may prolong life. Doctors are eager to use this new treatment for their patients whose breast cancers have gone beyond the stage where operation will help.

But indiscriminate use of the hormones is dangerous. In some cases, female hormones speed the rate of growth of the cancer. Patients with cancer that has spread to the bones and who have a lot of calcium in their blood have been made very ill by the male hormone treatment that has helped others.

The treatment is still in the experimental stage. But by the proposed trials of it on large numbers of patients with careful records to be impartially judged, it is hoped that its exact place in the fight against cancer can be learned. Some breast cancer patients will be helped now. Many more, with other kinds of cancers, may be helped in the future because, the committee hopes, the studies will tell more about the part hormones play in cancer. Such information could lead to a basic attack on cancer either through better treatment in early stages or through prevention.

Five firms have offered to supply substantial quantities of male hormone for the studies. Others are considering participation in the project.

The cases under treatment will be reviewed by two groups of consultants. One of these will be a group of X-ray specialists who will study and evaluate

X-ray pictures of all patients before and after hormone treatment. The other group will be pathologists who will study specimens of the cancers themselves, before and after treatment, to give their independent verdict on the

effects of the treatment.

Chairman of the committee in charge of the trials is Dr. Ira T. Nathanson, of the Massachusetts General Hospital, Boston. Other members are: Dr. Frank E. Adair, Memorial Hospital, New York; Dr. Willard M. Allen, Washington University School of Medicine, St. Louis; and Dr. Earl T. Engle, College of Physicians and Surgeons, Columbia University, New York.

Science News Letter, December 20, 1947

Wood deep under water may last for hundreds of years unless eaten by sea worms.

AERONAUTICS

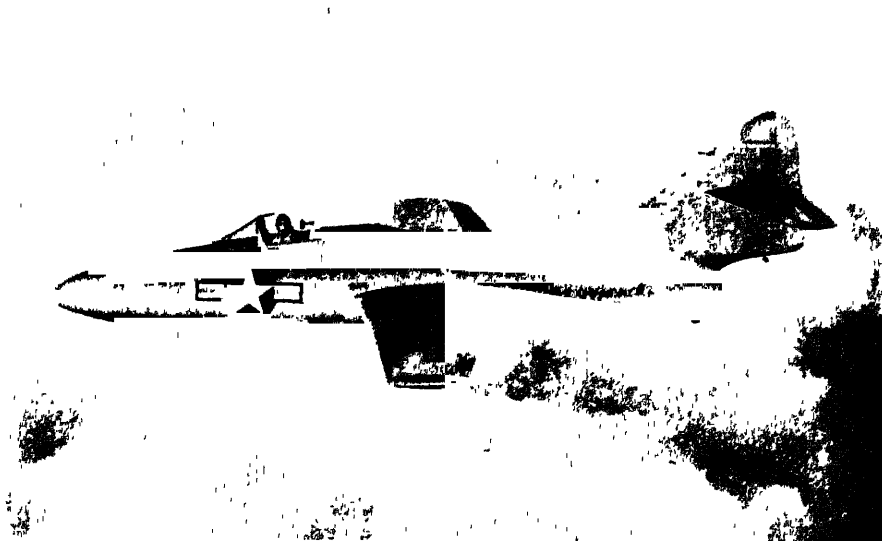
Jet Plane Folds Its Wings

► A NEW jet-propelled carrier-based fighter plane for the U. S. Navy has had its first flight test at the Long Island plant of the Grumman Aircraft Engineering Corporation at Bethpage, N. Y. It is a fast plane, with folding wings, and especially designed for take-off and landing on a short runway.

In general appearance the new plane, which will be known as the Grumman XF9F-2 Panther, resembles other familiar jet fighters except for its short square-tipped wings which fold for shipboard storage. The movable leading edge of the wing, which moves in conjunction

with the wing flaps in landing and take-off, provides improved stalling characteristics and added lift.

The first experimental model of this plane is powered by a Rolls-Royce Nene engine, developed in England but built in this country by Pratt and Whitney. Some later planes will have Allison turbo-jet engines. This is a re-designed model of the General Electric I-40 which Allison has been exclusively developing and building since 1945. It is the engine in the Lockheed P-80 Shooting Star that set an international speed record of nearly 624 miles an hour. This record



CARRIER-BASED JET—To be known as the Grumman XF9F-2 Panther, it resembles other jet fighters except for its square-tipped wings which fold for shipboard accommodation. It will be the first jet-fighter which can use either of two engines—the Rolls-Royce Nene engine or the Allison turbo-jet engine.

has since been beaten by the Navy Douglas Skystreak travelling at 650.6 miles an hour.

The Navy plans to use both of these engines in future Panthers, and although not identical they will be interchange-

able. The plane will be the first jet fighter with a dual source of engines. This is to assure an uninterrupted engine supply and will tend to make lower production costs.

Science News Letter, December 20, 1947

METEOROLOGY

Water Can Make Rain Fall

Common cumulus clouds of any temperature will precipitate in a "chain reaction rainfall" when sprinkled with water.

➤ WATER, of all things, can be used to make rain fall. This latest and ironic development in rain-making was reported in a communication to the National Academy of Sciences by Dr Irving Langmuir, associate director of the General Electric Company's Research Laboratory.

He advanced the theory that a little water dispensed on the right kind of cloud at the right time under the right conditions would start what the scientist termed a "chain reaction rainfall." Water, instead of the dry-ice or silver iodide used in earlier experiments, would trigger rain from common cumulus clouds, a type of heaped up white cloud found over the South and Pacific coast regions throughout the year and over the Northeast commonly in the summer.

"Theoretically," Dr. Langmuir told fellow scientists, "a single drop of water, if dispensed in the right spot, would be sufficient to cause the chain reaction rainfall."

Unlike the dry-ice experiments, water could set off precipitation from cumulus clouds of any temperature. In order to produce rain with water on a cumulus cloud, the cloud must have a vertical, upward current of at least five miles per hour, contain fully-grown water droplets, a high water content and a thickness of several thousand feet.

Under the new theory, the falling water particles would grow as they fell through the cloud until they reached a critical size of about three-sixteenths of an inch. After that, the particles would shed smaller bits of water which would be carried back into the cloud until they grew big enough to fall.

Dr. Langmuir said he believes this type of rain-making has already been achieved. He developed the new theory from reports of unexplained rain in some of the dry-ice experiments. In some cases, he explained, ordinary ice

particles on the dry-ice probably melted to set off rain under conditions where dry-ice alone should not have produced any precipitation.

Science News Letter, December 20, 1947

ASTRONOMY

Discover Huge New Comet From Ship in Pacific

➤ A HUGE comet streaking across the southern sky just after sunset, trailing a tail estimated to be 40,000,000 miles long or the length of the whole Big Dipper, was discovered Dec. 8 from a ship at sea in the Pacific.

Exact measurements of the position of the comet were hard to make because when discovered it was low in the sky and no bright stars were nearby.

The first magnitude object, bright as Halley's comet last seen in 1910, has not yet been named officially other than comet 1947n. Comets usually bear the name of the person or persons who first find them. This one was discovered by someone as yet unidentified. It may be known as "Comet Ship."

Science News Letter, December 20, 1947

CHEMISTRY

Ammonium Sulfamate Made More Easily

➤ AMMONIUM sulfamate, one of the sensational weed-killing chemicals born of the wartime emergency, is manufactured in a more direct and economical way under a new procedure on which U. S. patent 2,426,420 has been issued to Ernest J. Tauch of Cleveland Heights, Ohio.

The method is an improvement on an earlier German process which was largely a failure. Theoretically, ammonium sulfamate should result directly when ammonia and sulfur trioxide are

mixed. In the German process this was attempted with both compounds in the gaseous state, but the reaction produced unwanted ammonium imidosulfonate instead. By mixing an excess of liquid anhydrous ammonia with sulfur trioxide in either liquid or solid form, Mr. Tauch has been able to obtain the desired compound. Care must be taken, he states, to make the mixing rapid and thorough, and to get rid of the heat evolved in the reaction. Evaporation of the excess ammonia helps accomplish this.

Patent rights are assigned to E. I. du Pont de Nemours and Company, sole manufacturers of ammonium sulfamate, who market it under the trade-name "Ammate".

Science News Letter, December 20, 1947

SCIENCE NEWS LETTER

Vol. 52 DECEMBER 20, 1947 No. 25

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS

Subscriptions—\$5 00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago, State 4439

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GENERAL SCIENCE

Science Review for 1947

Nature of smell, change of proton to neutron, printed circuit radio and man-made rain are among the most important discoveries of the year.

This summary of the year's happenings in the world of science is limited by space to just the highlights. Most of the events are described in detail in the pages of the SCIENCE NEWS LETTER for the current year. If you wish to refer to any particular report, you may find it readily through the index (See SNL, June 28 and also the issue which will appear next week, Dec. 27).

By SCIENCE SERVICE STAFF

► **DISCOVERY** that the sense of smell operates through odoriferous substances filtering out heat rays inside the nose may be ranked in future years as the top science achievement of 1947.

The successful use of streptomycin against some kinds of tuberculosis was an outstanding medical advance, while the outbreak of cholera in Egypt was a warning that epidemics are still a world menace.

In aviation, the push-button Atlantic round trip of a plane unpowered by human hands gets top billing, while the trial flights of jet-propelled bombers of great size and the undoubted but unannounced advances in guided missiles of a major sort are important military science developments.

Sunspots were more plentiful than they have been for 100 years and their cycle came to a peak. The great mirror of the 200-inch telescope was carried to Mt. Palomar, Calif., and soon will see farther into space.

Artificially-made long chains of protein molecules gave promise of new developments in medicine and plastics, possibly explaining some living mechanisms.

In the new highest voltage atom smasher at Berkeley, Calif., proton and neutron were turned one into the other; a new array of light isotopes were created and new elemental transmutations accomplished.

Evidence grew for existence of man in America 10 to 20 millenia ago, and a 10,000-year-old human skeleton was found at Tepexpan, Mexico.

Radio sets, hearing aids and other electronic devices using war-developed miniature tubes and printed wire circuits appeared.

Man made rain on a limited scale by

sprinkling solid carbon dioxide or even water on clouds, and hope increased that something might be done about the weather.

Disordered agricultural production and crop failures, including the bad USA corn year, caused a world food crisis. Foot-and-mouth disease in central Mexico posed the most serious menace to livestock in North America.

Military applications of science in the unified defense establishment were reinforced and accelerated by a new research and development board, while the civilian national science foundation again failed to be created.

AERONAUTICS

Plane Crossed Atlantic Without Hands at Controls

PUSH-BUTTON flying enabled an Air Force plane to cross the Atlantic and land without human hands touching the controls.

New official world record of 6506 miles per hour was set by Navy pilot flying a Douglas Skytreak; an Air Force B-29 Superfortress flew 8,854.8 miles to beat the international closed course distance record.

Speedy Navy transonic Skyrocket plane, powered with both turbo-jet and rocket, was designed to fly 760 miles an hour.

A flying-wing Air Force bomber, with eight jet-propulsion engines and without tail or fish-shaped body, flew successfully.

An engine trouble analyzer was developed to enable the engineer to locate during flight improper operation that might cause engine stoppage.

Photoelectric instrument was developed to record automatically the cloud-height over airports; visibility-measuring device was designed to aid landings at airports; portable device accurately indicated wind speed and direction, important in airplane take-off.

Very high frequency navigation receivers for airplanes were developed for use with VHF radio ranges, static-free guide paths to their destinations.

Two new devices showed tower-control operators the exact position of an approaching plane and its altitude; fog dispersal system was used to aid instrument landing systems; television and radar were combined in an aircraft navigation and landing aid, 15-pound radar equipment warned pilots of too close approach to earth.

Lights producing flashes strong enough to penetrate any weather for at least 1,000 feet were developed to aid airplane landings; lighting system for small-town airfields was made to be moved with change in the wind.

Two supersonic wind tunnels were com-

pleted to create conditions met at altitudes of 50,000 feet to 100 miles; system of 10 chambers was devised for studying the effects of weather on aircraft accessories, hangar that simulates extreme weather conditions encountered in operation was developed for testing new aircraft and equipment; air eddies were eliminated in wind tunnels by use of improved fine screens.

One-ton monoplane for Army liaison work, designed to clear a 50-foot obstacle within 600 feet of take-off, has a passenger-carrying boat-shaped body for pilot and observer suspended below the wings and forepart of the boom.

Glider that discards wings and tail when it lands upon the water, and like a motorboat is powered by a small gasoline engine, was designed for use in shipwreck rescue.

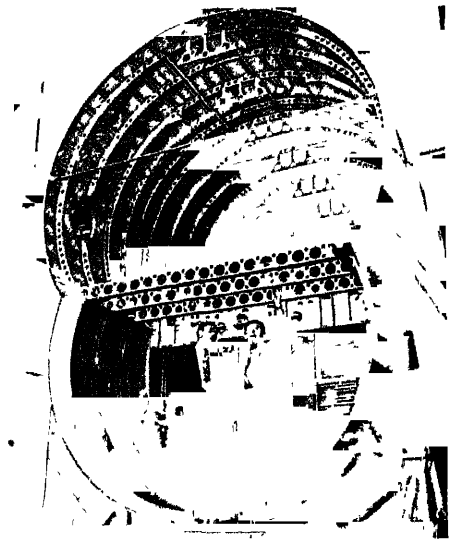
The Air Force XB-47, a six-jet engine bomber, incorporates swept-back wings and tail surfaces that are ultra thin.

Speedy combat aircraft, Navy XF2R-1, has a gas-turbine engine in front and jet-propulsion engine in the rear.

Men cleared the tail of a speeding jet plane by being shot from the cockpit at a velocity of 60 feet per second.

Parachute of criss-crossed wide fabric ribbons safely lowered to the ground a jeep and howitzer at the same time.

A tractor-track of the endless belt type, installed on the landing gear of heavy Air Force cargo planes, was found practical for landing on soft dirt, mud or sand, inter-



TWO-STORY AIRLINER—Shown in the process of construction is this 67½ ton sky giant, the Boeing 377 Stratocruiser. A fleet of these will be used for 340-mile-an-hour coast-to-coast and Pacific Coast-Honolulu service. Accommodations for 55 passengers will include stateroom and sleeper facilities, lounges, food galley and bar. It will also carry 8,000 pounds of cargo.

changeable landing wheels, skis and floats permitted a plane to land on earth, snow or water.

Air Force helicopter with overlapping rotors was designed to carry pilot, co-pilot and 10 passengers, Navy 10-passenger helicopter, with fore and aft rotors, was accepted by the Service.

The Banshee, powerful single-seat Navy fighter capable of flying 600 miles per hour and climbing 9,000 feet per minute, successfully passed flight tests.

Airplane noise nuisance was decreased by use of propellers with an increased number of blades rotating at lower speeds than usual.

Transcontinental Racon-route, system of short-range aerial navigation utilizing radar, was installed to enable pilots on the route to determine their exact positions at all times.

Air Force XC-99, designed to carry a load of 100,000 pounds or 400 passengers, passed ground tests.

Hughes' giant eight-engine flying boat, with a wingspread of 320 feet, made successful flight.

Engine exhaust gases, which contain too little oxygen to support combustion, were successfully used in the vacant spaces inside and around fuel tanks as fire protection.

Glass that conducts electricity, and thus can be electrically heated to keep it free of ice, was installed in control cabins of the giant Stratocruiser.

Helicopters were put into regular service to shuttle passengers from suburban cities to mainline airports used by long-range transports.

Flying tanker refueled an airliner in flight within 20 minutes in attempt of British to extend range of airliners.

ANTHROPOLOGY AND ARCHAEOLOGY

Ancient Javanese Skull Collection Now Complete

COLLECTION of 11 fossilized human skulls, at least four times as thick-walled as modern man's, representing a people with bulging beetle brows who lived in Java over a third of a million years ago (*Homo soloensis*), was made complete with return of one missing member taken as war booty just after their discovery.

Almost complete lower jaw of a large ape-man with incipient chin, oldest human-like skull with stuck-out chin, was found in a cave at Sterkfontein in South Africa near skull of toothless elderly female, lacking lower jawbone, with brain capacity about equal to those of present-day large apes and only a third that of modern humans.

Crude stone implements unearthed in Nebraska associated with animal bones suggested that men camped there 20,000 to 35,000 years ago; no human skeletal remains were found.

Remains of America's earliest known human being, with age estimated at 10,000 to 15,000 years, were discovered in Tepexpan, Mexico, through use of geophysical prospecting methods, and brought to Washington for restoration.

Discoveries of Mersin in southeastern Turkey showed a chalcolithic or "copper" age transition period from late stone age to bronze age.

Monumental architecture from early prehistoric ages, probably well before 3,000

B. C., was found in southern Iraq at the site of Abu Shahrain excavations.

Complex structure assumed to be the burial place of a Hittite king, containing evidence of elaborate funerary rituals, was investigated at Tell Atchana in the Hatay area of Turkey.

Eleven heretofore unknown Mayan temples, dating from 495 to 672 A. D. and regarded by archaeologists as most complete find of recent years, were discovered.

Indians with features characteristic of the general American Indian neighbors of first New England settlers were reported living on Martha's Vineyard island off southern coast of Massachusetts.

U S Government entered archaeology on a national scale by initiating a survey of all archaeological sites on rivers where dams are to be built or other major changes undertaken.

ASTRONOMY

Find Sun Has Regions of Unsuspected High Energy

BROAD, fuzzy absorption line of the sun's spectrum was found to be identical with the red "coronium" spectrum line seen during solar eclipse, this indicated that the sun has regions of much higher energy than previously suspected.

A gigantic sunspot, easily visible through smoked glass, lived to be seen during four rotations of the sun, more sunspots were seen during May than in any month for more than 100 years.

Light and dark patches bearing some resemblance to sunspots were observed on a distant star, this is the first time surface features of any star beyond the solar system have been reported.

Mars' atmosphere contains an appreciable quantity of carbon dioxide, even a larger percentage than is in the earth's atmosphere, spectrographic study of infrared sunlight reflected by the planet indicated.

New comets Rondonina-Bester, Becvar, Rester IV, Jakovin, Wirranen, Reinmuth, Bester V, Honda and 1947N were discovered, comets Grigg-Skjellerup, Faye, Whipple, and Encke were rediscovered.

Giant 200-inch disk, successfully ground, was moved to Mt Palomar to be installed in its dome and project man's sight into the universe two times further than ever before.

A nova or "new" star was spotted by photography in the constellation of Sagittarius.

A star was found to be rotating rapidly with its axis pointing toward the earth when the lines of its spectrum are not broadened but split into two components due to the effect of the star's strong magnetic field.

A negative correlation was found between size of meteorites and helium content, indicating that accurate estimate of the age of a meteorite cannot be based on helium content alone.

Both red and blue members of Antares, giant red star, were found to be surrounded by an enormous cloud of iron particles existing as extremely minute solid particles instead of in gaseous form.

Production of artificial meteors, created by shooting swarms of iron missiles from V-2 rockets in flight, was attempted to aid study of ionization that affects long-range radio transmission.



ANCIENT CAMPSITE—A 20,000 to 35,000-year-old campsite is being attacked with picks and shovels to uncover more traces of the semi-nomadic hunters who were America's oldest known inhabitants. The site is at Lime Creek, Nebraska.

Radar bearings on the sun indicated that the cosmic radio noise originates from long, thread-like prominence filaments that surge into the sun's outer regions.

Total eclipse of the sun on May 20 was recorded by several expedition groups to Brazil, where totality lasted almost four minutes; changes in ionized layer of earth's atmosphere, displacement of stars close to sun, moon's shadow and cosmic rays were studied during totality.

The sun is producing much more energy than is currently believed, study with a sky-observing variation of the snooperscope indicated.

A cloud of gas, dust and cosmic debris, that while in the process of collapsing clashes with another cosmic cloud, might give rise to a solar system with planets, it was suggested, planets thus created would move with circular orbits close to the star's central plane, the largest masses remaining farthest from the sun.

Stages by which stars are built up were reported: individual atoms stick together to form small solid grains, these cosmic grains are molded into clouds by force of radiation pressure, clouds condense to form small dark nebulae that upon compression heat up to become stars.

Cosmic dust is created by condensation, it was reported, every gas atom in interstellar space freezing onto the solid particle which it strikes.

Cloud of cosmic dust between us and stars in the region of the Great Rift in the constellation of Cygnus was stated to decrease the light of the stars a hundred-fold.

Light from white-hot stars was reported to receive a red tint from the tiny particles of interstellar dust through which it passes.

Use of photocells sensitive to red light far beyond the region visible to the human eye

made possible study of atomic lines in infrared solar spectrum, determination of infrared absorption by matter between the stars in the Milky Way and measurement of brightness of stars by day.

New tunable filter showed speed with which gases on the sun move toward us and made it possible to calculate the actual position of these fiery prominences in relation to the sun, a machine was developed to find a star on a photograph and measure its brightness.

New minor planet was discovered following inauguration of world-wide program for study of asteroids

ATOMIC POWER

Exchange Forces Found In Nucleus of Atom

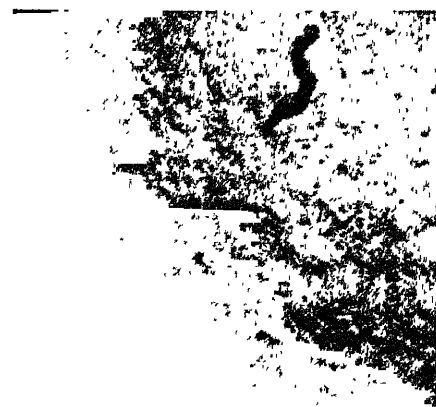
PROTON, heart of the hydrogen atom, and neutron, trigger of the atomic bomb, were found capable of turning one into the other through exchange of the identifying electrical charge

Twin or isotope of element 87, francium, was found to turn into astatine, another rare element, after existing only five minutes, neutron bombardment of hafnium produced a new isotope of that element with a half-life period of ten minutes

Fission, originally confined to heaviest elements, was caused in atomic nuclei as light as tantalum, element 73, by ultra-high energy atomic bullets fired by a giant cyclotron; nuclei of platinum, lead, bismuth and thallium were also split

Thirty-four different elements were detected among the fission products of atomic-bomb uranium, neodymium, barium, zirconium and molybdenum were found to account for nearly half of the weight of the uranium split asunder.

Elements were transmuted 16 steps down the periodic table and 22, possibly 30, particles were knocked out of an atomic heart



IGNORING ATOMIC EXPERIENCE—These are living sea cucumbers, known as holothurians, on the ocean bottom directly under where the bomb exploded at Bikini. The mud where they are living was highly radioactive and still is somewhat.

or nucleus with the new 4,000-ton synchrocyclotron.

An apparatus which turns the nucleus of an atom into a miniature radio transmitter sending out a signal that identifies the chemical element was developed on an experimental scale.

Atomic energy pile using plutonium without a moderator, activated by fast neutrons, was devised to release energy slowly

Bevatron, atom smasher that can speed up electrons to a billion electron volts, was designed.

Photograph was taken of an elusive subatomic particle, the mesotron, that lived only a fraction of a second and then disintegrated; the mesotron is 200 times as massive as the electron and the neutral particle resulting from its disintegration has a mass 50 to 60 times that of the electron.

Three of the four unnamed chemical elements were christened 43, first artificially-made element, is called technetium (Tc); 85 is given the title of astatine (At), 87 is named francium (Fr), 61, known as promethium, is being investigated to determine whether that obtained from the atomic pile is identical with the naturally-occurring element announced two decades ago

Long-life radioactive iodine was produced by bombarding the chemical element tellurium

Improved method of separating carbon of atomic weight 13, useful in medical, biological and industrial research, consists of distilling carbon monoxide over a large-area column into liquid nitrogen as a cooler

Visible light was found to be given off by moving electrons in a 70,000,000-volt synchrotron, and the electron beam was made visible by its own light

Three major Atomic-Age research developments were establishment of biological laboratory at Oak Ridge, Tenn.; founding of three regional institutes for nuclear studies, first sales of radioactive isotopes.

ALSOS report showed that an American scientific mission preceded troops into Germany and found that Germans, although working on an atomic pile, had missed the discovery of how to make an atomic bomb

Heaviest and most violently radioactive of the chemical elements, curium (no 96), was isolated in sufficient quantity to be barely visible to the unaided eye, it glows brightly enough to be photographed by its own visible light.

Chlorine, common salt element, was changed by exposure to neutrons in the atomic pile to a radioactive form which will continue to give off radiation for more than a million years.

BIOLOGY

4-Day-Old Human Embryo Obtained for First Time

HUMAN embryo only about four days old was the first and only authenticated one obtained before attachment to the uterus in the mother's body.

Before birth, superior babies-to-be were successfully transplanted into mother rabbits of just ordinary breeding.

Some hereditary traits were declared to pass from one generation to another by means of plasmagenes, carried in the general protoplasm of the cell rather than as genes in or

on the highly specialized little nuclear rods and spheres known as chromosomes

Changes in the chromosomes of developing male sex cells of plants were produced with radioactive phosphorus taken up in water absorbed by the plants.

Guppy-like fish known as *Mollisenesa formosa* were reported to have only one sex—female.

Many cities were made virtually flyless by combined clean-up and DDT-spraying campaign

Outbreak of hoof-and-mouth disease in central Mexico seriously menaced livestock industry in the United States, especially after authorities abandoned eradication by slaughter and burial

Tristeza or quick decline, disease of orange and grapefruit trees, was found due to a microscopically invisible, filter-passing virus, in South America and Australia the disease spreads more rapidly from tree to tree than in California

Weed-killing chemical, 2,4-D, was found to kill plants by robbing them of ability to utilize oxygen in their life processes, onion juice mixed with 2,4-D boosted its weed-killing capacity from 10- to 20-fold; ultraviolet radiation changed its plant-killing power

HET, newest terror to bugs, killed red spiders and red mites; methoxychlor, close chemical relative of DDT, was reported only one-fortieth as poisonous to man and warm-blooded animals, benzene hexachloride, British insecticide, before killing, deprived single-celled animals of their power to divide, bladin, German-produced insecticide, was tested as a DDT supplement.

Radioactive tracer atoms were used to chart accurately the course of one of the new plant-killing chemicals from the spot where a small quantity is placed on a bean leaf, down the stem and throughout the rest of the plant.

Sugar formed in one leaf of a large sugarcane stalk during one hour's work in the sun was distributed to all parts of the 11-foot, seven-pound stalk within three days, use of carbon atoms tagged with radioactivity showed

Oxygen absorbed by a plant along with carbon dioxide becomes part of the plant structure, while oxygen that goes in as part of water is excess and comes out again as pure oxygen, it was demonstrated through use of heavy oxygen of atomic weight 18.

By use of radioactive carbon 14 it was discovered that carbon atoms do not linger long in the simple acids and sugars into which they are first built by green plants, but within the first hour are to be found in the more elaborate molecules of cellulose, lignins, carotinoid pigments, amino acids and proteins.

Radioactive "tag" was given to tobacco mosaic, disease-causing virus, by inoculating the virus into tobacco seedlings which were then fed with radioactive phosphorus as part of their mineral nutrient solution.

Early history of copper in the bodies of cattle was studied by the radioactive tracer method, which revealed the heaviest concentration is in the liver.

Fertilizer needs of plants were studied with radioactive phosphorus.

Chlorophyll, green plant pigment that lays the foundation of all foods, was found through use of radioactive carbon of atomic weight 14 to do its work in a two-stage proc-

ess, one stage being carried on in the dark.

Chromosomes, heredity-controlling structures, were successfully photographed with an electron microscope.

An enzyme, phosphoprotein phosphatase, was discovered which liberates phosphorus from protein in the eggs of frogs so that the embryo can use the phosphorus in its development.

Cells do all their growing in the immediate neighborhood of their nuclei, then the new-grown living substance migrates to the outside of the cell, study of nerve fibers indicated.

British-originated chemical, isopropyl-N-phenyl carbamate (IPC), proved successful in conquering quackgrass.

DDT stopped the powder-post beetle that damages bamboo and killed the bark beetle that carries elm disease fungus; it protected fruit against damaging insects; warning was issued that DDT be used with care as it can also kill insect friends, and harm small birds, pets and even man.

Rubber trees immune to destructive leaf-spot disease were introduced into cultivation.

Announcement was made of a strain of chickens genetically resistant to range paralysis, destructive virus disease.

Hens lay eggs according to when they get fed rather than according to time of daylight, experiments showed.

Substance that checks growth and one that speeds growth were found in sugarcane.

Minute virus particle was found to kill a bacterium by stealing its phosphorus.

Bacterial strains that resist action of penicillin, streptomycin and other antibiotics were shown to result from rapid evolution or mutation, and not merely a survival of the toughest or selection of resistant cells already there.

Infant orchid plants that grow but never grow up were produced by "doping" them with barbiturate drugs.

Better yields of turpentine and rosin were obtained by inoculating pine trees with spores of a disease fungus when they are tapped.

Heat-treated corn seedlings were found to grow up into plants unable to produce fertile pollen.

Podophyllin, resin extracted from root-stocks of mayapple plant, was found to have the colchicine-like effect of stopping cell division half-way and thereby producing giant varieties of plants.

Too little sleep for too many nights was discovered to retard the growth of white rats and make them highly irritable, but not to impair their ability to learn.

Evolutionary jumps or mutations in mice were produced by a chemical compound, methylcholanthrene.

Eelgrass, chief food of many coastwise wildfowl, was reported to be increasing rapidly after almost being exterminated 15 years ago by a fungus disease.

Living pines of a supposedly extinct species were found to be natural hybrids.

Redwood trees identical with fossil remains of an ancient redwood genus that once grew in the entire northern hemisphere were discovered in central China.

Blood bank for valuable horses, cows and dogs was opened.

Living organisms, viruses and vitamins were sealed in carefully-labelled glass tubes to be opened for research purposes two centuries from now.

Army's soilless gardens produced millions of pounds of vegetables in Japan.

Treatment of seeds with solutions of salts of radioactive elements, and use of such salts along with fertilizer in the soil, was claimed to cause increased yields.

Birds have a state resembling hibernation, observations of many scientifically trained persons indicated.

CHEMISTRY AND PHYSICS

Printed Circuit Radios Made in Calling-Card Size

WORLD'S smallest radio station, complete with tube and circuit that fits in an empty lipstick case, and tiny four-tube radio, calling-card size, proved successful, they utilize the war-developed technique of printed circuits.

Radio tube the size of a rice grain was developed.

Transparent plastic, known as NBS casting resin, was announced as war-developed to shield delicate tubes and circuits without interfering with operation of electronic equipment.

Female sex hormone, effective in small amounts, was concocted artificially from simple, cheap chemicals; it can be given by mouth to relieve women undergoing the difficult transition associated with middle age.

Fibrous protein molecules as complex as those in the human body and other living structures were synthesized, and protein molecules were induced to join one to another in long chains in much the same way that hydrocarbon molecules polymerize to form synthetic rubber.

New scientific terms proposed include the "nuclide," defined as species of atom characterized by the construction of its nucleus, particularly the number of positive electrical units and neutral particles in the nucleus of the atom; and "langley," defined as amount of solar radiation received on one square centimeter, capable of raising the temperature of one gram of water one degree Centigrade.

Neutral meson, sub-atomic particle that lives but one ten-quadrillionth of a second after creation by bombardment from outer space, was declared to play a major role in the creation of cosmic rays.

Cosmic rays were found constantly to create radioactive carbon, present in living organisms and recently dead organic matter.

Sensitive radar was used to detect electrical bursts from energetic cosmic rays.

Diamonds, size-for-size, were found to be a thousand times more sensitive detectors of alpha, beta and gamma rays than the counters ordinarily used.

Synthetic stones, far more brilliant under electric light than in daylight, were made from titanium oxide; star sapphire was made from aluminum oxide.

Gem stones were given the color of more valuable stones through X-ray treatment, but heat or sunlight brought them back to their normal color.

Light was utilized to turn petroleum compounds into synthetic rubber, vapors of such metals as zinc, cadmium and mercury being used as catalysts.

Nylon plastic was synthesized from corn-cobs and oat hulls instead of coal, air and water.

Synthetic compounds with much the same

effects on bacteria and fungi as natural antibiotics were created; most powerful, acrylophenone, has drawback of being only slightly soluble in water and closely related to another compound highly poisonous to animals.

Tyrosine, fundamental body chemical, was synthesized with radioactive carbon; radioactive tyrosine may disclose why potatoes and apples turn black, and help solve some of the mysteries of "black" cancers.

A new chemical, lithium aluminum hydride, was revealed as a reducing agent for highly stable organic compounds.

Noble prize in physics was awarded Sir Edward Appleton of Britain's Department of Scientific and Industrial Research for pioneer work on the ionosphere; Sir Robert Robinson of Oxford University won the chemistry award for research on alkaloids.

EARTH SCIENCES

70 Major Earthquakes Recorded on Seismograph

THERE were 80 earthquakes of sufficient strength to record themselves on distant seismograph instruments so they could be immediately located, and no less than ten occurred during the eight days after Aug. 26, one on Nov. 1 in Peru caused considerable loss of life and property damage.

Remains of the salamander-like stereospondyls, highest type of vertebrate life known during transition period from Age of Fishes to Age of Reptiles, were found in New Mexico as part of a total find of 35 skulls of animals that roamed the earth 150 million years ago.

Fragments of pelvis, jaw and skull found in Arizona were believed to be those of *Chirotherium* or "hand animal," dinosaur's granddaddy, which dominated the world from about 150 to 200 million years ago.

Nearly-complete fossil skeleton of an extinct Eocene mammal named *Meniscotherium* was discovered in New Mexico; this animal living 60 million years ago may prove to be the ancestor of modern hyraxes or Biblical "conies."

X-rays were used to bring out fine details of bony structure of small fossil fish found embedded in shale.

Underground burning of coal beds long ago was held responsible for certain clinker-like rocks and red beds found in Powder river basin in Wyoming and adjacent areas.

Systematic exploration of world's longest mountain range, the submerged Atlantic ridge that extends almost from pole to pole, was begun.

Mud on the ocean bottom is 9,000 feet thick in places, echo-sounding survey indicated.

Flat-topped mountains that dot the bottom of the western Pacific were described as stumps of volcanoes that became submerged more than half a billion years ago; new chart of Pacific ocean bottom showed a 40,000-foot difference in elevation between bottom of Mindanao trench and tops of highest mountains in the eastern Philippines.

Pacific shoreline once stood along a line running from western Montana to El Paso vicinity, studies showed.

Weather on the ground was reported to come from great whirling eddies cast off from a vast air-river ten miles up, flowing from west to east around the earth with speeds up

to 200 miles an hour.

Man-made earthquake was created by a blast of 4,600 tons of high explosive set off at Helgoland, and vibrations of the blast were recorded on 18 seismographs along a line from the North Sea to the Adriatic.

Volcanoes that erupted include. Mayon volcano in the Philippines, Akutan volcano in the Aleutians, Sicily's Mount Etna, Mount Hekla in Iceland, the Nicaraguan volcano Cerro Negro, and Mount Asama in Japan.

Strangely - colored, never - freezing lakes similar to some in Yellowstone National Park were spotted in Antarctica.

Plans were completed for a World Meteorological Organization to replace the old but unofficial International Meteorological Organization.

Torrential rains in June caused Mississippi and Missouri rivers and all their northern tributaries to go on a ruinous rampage, hurricanes in September devastated parts of Florida and Louisiana.

ENGINEERING AND TECHNOLOGY

Dry Ice Seeding of Cloud Makes Rain and Snow

MAN-MADE snowfall and rain, produced by seeding a supercooled cloud with dry-ice fragments, pointed the way to possible artificial climate changes that might result in less severe thunderstorms, elimination of hail and airplane icing, water seeding was also proposed for making rainfall.

One-step camera produced a finished, dry picture and completely developed negative in one minute; heavy-weight camera for reconnaissance work showed pairs of photographs one minute after they were snapped.

Laboratory camera for taking and developing research pictures was announced; match-box camera and vestpocket darkroom were devised for pictures one-half inch square, machine automatically processed X-ray film in one hour.

Motion picture camera, for use in research and industrial processes, took five million pictures a second, ten times more than high-speed cameras produced before.

Electronic photo-flash unit that fires photographic flashes at three-second intervals was developed; camera with an effective exposure time of four hundred-millionths of a second, used in studies of electrical discharges, was described.

Aerial photographs for large area surveys were taken along straight and parallel lines in the sky through use of a position indicator working in conjunction with Shoran, war-developed navigation aid based on radio.

Automatic pilot successfully varied the altitude of a V-2 rocket in flight, furnishing the first step toward guiding the flight of rockets from the ground by radio control; diffuser of a ram-jet or "flying stovepipe" was successfully tested through use of V-2 rockets.

Flight of long-range rockets was recorded on motion-picture film through the use of an astronomer's telescope placed on the mount of an anti-aircraft gun.

Aluminum metal was obtained from kaolin clay through a process that consists of roasting the clay, digesting it with dilute hydrochloric acid, filtering to remove the insoluble silica, and adding hydrochloric acid gas to produce aluminum chloride crystals.

The common clay bentonite was used to

produce a new plastic by taking advantage of the chemical reaction between bentonite and resin-forming organic polymers.

Nickel and cobalt were successfully plated on metal without the use of an electric current by chemical reduction of nickel or cobalt salt with hypophosphite in hot solution.

Titanium was made possible as a pure metal for industrial use through an improved process that reduced titanium tetrachloride with pure molten magnesium in the presence of helium gas under pressure.

Gas for generating power and manufacturing synthetic products was produced by burning unmined coal in the ground.

Coal-burning gas-turbine locomotives were developed to use finely pulverized coal.

Optical glass for television mirrors was successfully cleaned by bombarding it with electrons under vacuum.

Glass-free porcelains, capable of withstanding heat up to 2,000 degrees Fahrenheit, were made from alumina, beryllia, zirconia and thorium.

Series of tough, serviceable new paints was produced from lactic acid, souring agent in milk.

Electronic stopwatch measured the speed of atomic particles to one thousandth of a millionth of a second and determined the energy of the charged particles in nuclear reactions.

Invisible infra-red rays, used in the same manner as in an Army snooperscope, were reported superior for examining human eyes as they do not disturb the eye under observation.

New chemical resin emulsion, when pumped with water down the well in second-

dary recovery of oil, was found to plug the more permeable layers from which oil has been driven and to direct the water pressure to the other layers.

Dangerous factory and mine gases were detected by an electronic ear that analyzes mixtures of two gases by measuring the speed of sound waves passing through them.

Colored leads were used to record on ordinary paper colored pictures transmitted by wire or radio waves by a facsimile process.

Clearer long-distance telephone reception resulted from use of pulse code modulation technique that, instead of transmitting a continuous speech wave, sends samples at a very rapid rate using a set of code consisting of a definite arrangement of electrical pulses.

Speedy transmission of telegrams from outlying areas resulted from installation of a push-button system at the central office that called for only one typing of the message, at the point of origin.

Low pressure system to obtain oxygen from air, developed during the war, was adapted to industrial use, including possibly getting gasoline from natural gas.

Man-made crystals successfully replaced natural quartz used in telephone circuits.

Electroplated wire that can be bent, hammered, woven and twisted without flaking was produced by electroplating quarter-inch rods, then drawing them out into fine wire.

Robot electronic egg candler utilized the differences in quantities of electronic energy absorbed to separate good eggs from bad.

Production of a powerful 3,000-watt mercury vapor lamp greatly widened possi-



HONEYCOMB SANDWICH—This type of panel construction has gone into the building of an experimental house by the government. The core, which is the insulating material, is shaped by special machinery to resemble honeycomb. The picture shows a plywood cover being placed over it to be bonded to the core by a highly water-resistant phenolic resin glue. (See page 397.)

bilities of application of light to chemical reactions in the so-called photo-chemical process

Softening oil made from silica was used in making better rubber tires that resist heat, weather, chemicals and abrasion

Large savings in sugar resulted from storage of sugar beets at near freezing temperature while awaiting processing

Radiotelephone equipment was installed on trains, enabling passengers to telephone home or office.

Mightiest bolt of lightning recorded by instruments occurred during the summer, it contained an estimated 345,000 amperes of electricity

INVENTIONS

Thermal Process Captures Nitrogen from Atmosphere

NOTABLE and interesting inventions patented during the year include

Fixation of atmospheric nitrogen as nitric oxide by passing the gas mixture through a bed of incandescent oxide "pebbles," further heating in the combustion chamber, then sudden cooling in a twin chamber with unheated pebbles.

Process for purifying water by electricity precipitating the germs on sand or other granular dielectric material.

Addition of methyl-phosphorus compounds to fuel treated with tetra-ethyl lead to check the unsparked ignition due to the lead, without reducing its anti-knock properties.

Use of fluorine for production of synthetic rubber with high resistance to aging effects of sunlight and to action of oil and other rubber solvents, with high elasticity at low temperatures and high tensile strength

Oxygenless flame of very high temperature obtained from fluorine and hydrogen gases, for cutting or welding metals.

Rifle powder of high energy that consists of tiny grains of a finely pulverized high explosive such as TNT or PETN, each embedded in a pellet of more deliberately-burning smokeless powder.

Study of signal strength upon reception of radio waves of high frequency to obtain data on the relative humidity, temperature and pressure gradients of air masses between two points.

Device that measures the relative amounts of oxygen in mixture of gases by utilizing attraction of oxygen to a magnet.

Thorium extraction from phosphatic minerals containing it by exploiting the phosphoric acid released through addition of sulfuric acid.

Production of rhenium, element discovered two decades ago, from some sulfate ores by collecting the dust, washing, filtering and bringing down the rhenium in the form of an insoluble salt by addition of a soluble compound of potassium.

Production of ammonium sulfamate by mixing an excess of liquid anhydrous ammonia with sulfur trioxide in either liquid or solid form, then letting the excess ammonia evaporate.

More compact electron microscope which uses electrostatic fields instead of magnets for focusing its electron beam.

Beer of better flavor from malt left unbroken until its maximum diastase content

develops, then added quickly to the cooked starch mass

More rapid dehydration of vegetables through simultaneous use of radiant heat and current of dry, hot air, avoidance of oxidation spoilage by removal of oxygen without which oxidizing enzymes cannot function.

Production of a series of synthetic drugs with marijuana-like action, useful in treatment of narcotic addiction, typical compound made by condensing pulegone with one of the higher benzenes in presence of phosphorus-containing catalyst

Increased production of penicillin from a given batch of mold through the addition of a few hundredths of one per cent of phenylacetic acid.

Unwettable form of DDT with excellent film-forming properties.

Synthetic rubber with fluorine substituted for the customary chlorine

Greater production of glycerin through use of an acidified medium that enables ordinary yeast fermentation processes to progress more efficiently.

Increase of oil-well yields through use of bacteria of the genus *Desulfovibrio* that enlarges flow channels by dissolving limestone, makes oil flow more freely by lowering surface tension and increases gas pressure by producing carbon dioxide.

Automatic inspection of objects for standard shape or proper size through use of pairs of phototubes that select objects as approved when a shadow is cast upon only one of the tubes.

New type of viewing screen, composed of a thin layer of image-retaining potassium chloride crystals, for use with electron microscopes, making greater enlargement possible and taking of photographs without having a plate-holder in microscope's vacuum chamber.

Light-signalling system that uses light-waves of differing frequencies at a constant intensity to transmit messages.

Fire-alarm device triggered by ultraviolet rays from the fire's flame rather than by its heat.

Photo-reproduction of text or drawings at mimeograph speed by making use of tendency of tungsten, molybdenum and related metals to turn dark without further treatment when irradiated with light between high violet and near ultraviolet.

Impregnation of paper with methylol urea, a thermoplastic resin, to prevent shrinking, swelling and warping

Glass with high refractive index, useful for wide-angle camera lenses and microscope objectives, made by substituting germanium oxide for sand in a formula including also titanium oxide and sodium fluoride.

For production of red stained glass, introduction of the copper as vapor of copper chloride in the atmosphere over the still-hot glass.

Typewriter for Chinese characters that eliminates need for separate key and type bar for each character by arranging all the types in rows on a large cylinder rotated into alignment by pressing numbered keys.

Method for keeping a port ice-free by laying long lines of perforated pipes under the channel and pumping air through them.

MEDICINE

Streptomycin Arouses Hope for TB Conquest

HOPE of a chemical conquest of tuberculosis was aroused by good results of streptomycin treatment reported from many clinics

Initial trial of vaccination with BCG against tuberculosis was begun in the United States as part of a long-range study program

A chemical effective against tuberculosis in guinea pigs was found in long yellow crystals extracted from a lichen popularly known as California Spanish moss

Discovery of a prophylactic effect of penicillin against syphilis was announced.

Germs of athlete's foot and various other fungi and parasitic yeasts which cause disease in man and animals were knocked out with tomatin, new addition to the family of antibiotics, made by pressing juice from leaves and stems of the tomato plant

Germ in a badly infected leg wound yielded a disease-fighting chemical called bacitracin, found effective against boils, carbuncles, styes and ulcers

Chloromycetin, new penicillin-like remedy, was found effective against experimental rickettsial and virus infections.

Other germ-fighters include grisein, from the same soil organism as streptomycin and for use with it; aerosporin, from bacterium in some soils and tap water, modified form of gramicidin, for use against surface infections; and compounds found in radish seed, garlic, cinnamon oil and 213 species of mushroom.

Experiments with mice revealed that pneumonic plague was controlled by streptomycin in 90% of the cases

New chemicals tested as weapons against cancer were: KR, widely heralded Soviet discovery; radioactive gold; ethyl carbamate or urethane; a synthetic substitute for vitamin K; sodium fluoride, iodoacetic acid and malonic acid; and an old Indian remedy, podophyllin.

Sodium fluorescein, dye that glows under ultraviolet light, was used successfully to show a surgeon the extent of cancer tissue to be removed

Two blood tests for cancer were announced, one with the dyes, brilliant cresyl blue and methylene blue, and the other by inspection of serum under ultraviolet light.

Spread of cancer cells, called metastasis, was attributed to lack of adhesiveness of the cell surface

Chemical in mother's milk that causes breast cancer in mice was isolated.

Evidence of a relation between breast cancer and over-femininity, in the sense of unopposed action of female hormones, was found.

Jackson Memorial Laboratory at Bar Harbor, Me., famous genetic and cancer research center, was destroyed by forest fire

Clue to why cancer kills was found in its action of robbing the body of its stores of nitrogen and holding it trapped so the rest of the body cannot use it.

Discovery that marine bacteria can decompose cancer-causing petroleum hydrocarbons brought the suggestion of their possible role for preventing or curing cancer.

A red blood cell extract was developed and showed promise for use both as preventive and remedy for erythroblastosis, often

fatal disease of new babies born to mothers with Rh negative blood.

Tyrosinase, which turns potatoes black, and another chemical in urethane, were reported to have some benefit in treatment of leukemia.

New synthetic pain-relieving drug known variously as amidone, dolophine and 10820, was reported two to four times as effective as morphine, but also capable of causing addiction.

A morphine derivative, metopon, found less addicting than morphine, was made available for pain relief in cancer patients only and under restrictions to prevent its misuse.

Ten-year survey of male sex habits was reported.

A new operation and a special instrument were devised for freeing one of the heart's valves of binding scar tissues.

Blood-shunting operation in which the great cardiac vein was made to do the work of the heart's artery was developed for relief of coronary thrombosis and sclerosis.

Isolation of two more blood fractions, an iron-copper carrying chemical and another which separates as a mercury salt, was announced.

Two anti-influenza chemicals LL47 and apple pectin, effective in laboratory experiments, were reported.

New inroads against tooth decay include rhubarb mixed with lemon juice to protect teeth against the acid's erosive action, plan for mass control of caries at the source by adding glycerol aldehyde (simple, tasteless chemical) to all sugar at the refineries to check fermentation and acid formation from sugar as eaten; tryptophane, an amino acid, as a possible decay preventive, treatment of children's teeth twice a year with sodium fluoride.

Remedy for intestinal paralysis was found in a poisonous war gas, di-isopropylfluorophosphate (DFP).

Vitamin C and the amino acid, histidine, given together to cause release of histamine in the body were announced as effective treatment for serious conditions, including gangrene, in which blood circulation is impaired.

Improved treatment for infantile paralysis followed discovery that bulbar poliomyelitis takes five different forms, each requiring specific treatment.

First direct observation of protein synthesis outside the animal body, of importance in cancer study, was achieved with radioactive sulfur.

Body chemical called histamine was found to transform certain cells of the body from their resting state into active germ-eaters.

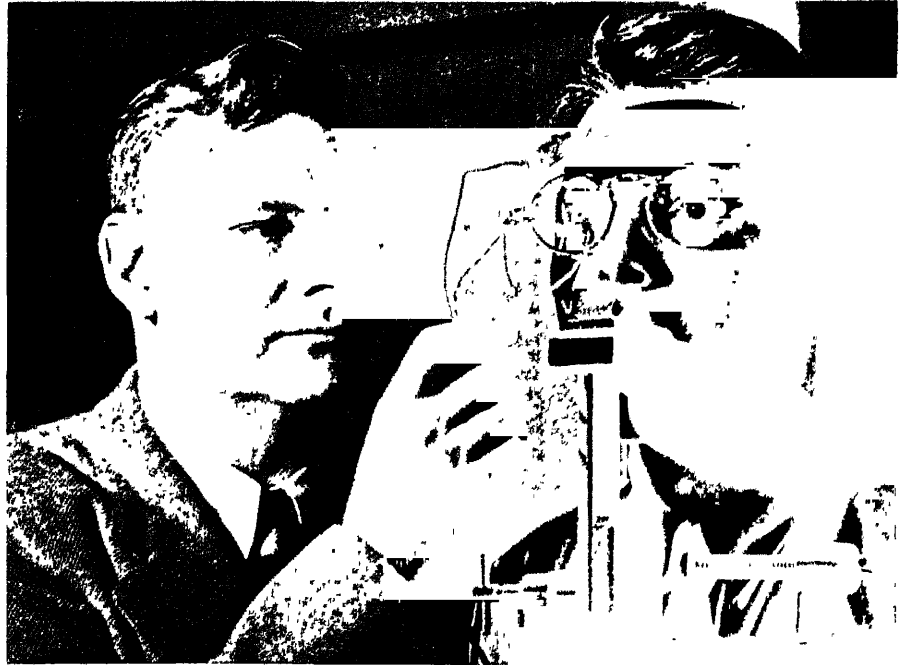
Antimalarial 100 times as powerful as quinine was extracted from the leaves and roots of a Chinese plant, *Dichroa febrifuga*.

PAB, used in ridding livestock of parasitic worms, had a sulfa-like action against the exceedingly minute germs called Brucella; chemical from mold found in soil of cattle inclosure showed promise as remedy for undulant fever.

Malaria germs were grown outside a human or animal body, offering a new technique for testing antimalarial drugs.

A dual photoelectric device clipped to the ear aided infantile paralysis patients by giving doctors an actual and continuous measurement of the oxygen in the blood.

Cyanine dyes and chemicals called piperazines were announced as promising for treat-



ELECTRIC RESPONSE—Dr. Lorrin A. Riggs, psychologist at Brown University, measures the electric current on the eye of his co-worker, E. Parker Johnson, by means of an electrode inserted in a contact lens. In this way it is possible to measure the eye's visual sensitivity. (See SNL, Nov. 29.)

ment of the tropical disease, filariasis.

One type of hardening of the arteries, atherosclerosis, was reported linked with the physical state of fat in the blood.

The anti-war gas chemical, BAL, was found effective in overcoming gold poisoning in arthritis patients getting gold salts treatment and also lead poisoning.

One of the nitrogen mustard war gases brought improvement in the incurable chronic disease, Boeck's sarcoid, but cannot yet be classed as a cure for the condition.

Quick antidote to the occasional hemorrhagic effect of heparin, anti-blood clot chemical, was discovered in protamine, a fish-protein chemical.

Blood chemical, hemin, was found to prolong insulin's action.

New fat hormone produced by the adrenal glands was discovered responsible for moving fat from liver reserves during starvation.

Peacetime national blood program for collection and distribution without charge of blood, plasma and blood fractions used to treat and prevent disease was announced by the American Red Cross.

An official long range research program on the after-effects of the atom bomb among Japanese was started.

A dye, toluidine blue, was found effective in laboratory tests in controlling the bleeding of radiation sickness.

New atomic danger, plutonium poisoning or "plutonism," was found to cause greying hair, liver damage and bone cancer in laboratory animals; treatment with a harmless metal, zirconium, to displace the poisonous element was reported effective.

Radioactive sex hormone was made for the first time by using carbon 14 from the atomic pile to prepare synthetic male hormone.

Radioactive germs and radioactive penicillin were prepared so that scientists could trace both the germs and the drug through the body and determine, if possible, how the body's immune mechanisms work.

A new drug, dibenamine, and pentobarbital may avert death from shock following severe bleeding, it was reported.

Patients with liver disease and abdominal dropsy were reported to have increased amounts of an anti-diuretic substance in the blood.

A fat mobilizing substance or hormone was discovered in the urinary excretion of fasting animals.

Para-aminosalicylic acid, PAS for short, proved effective in checking tuberculosis in guinea pigs, and clinical trials were started.

Microwaves, such as used in radar, were introduced as medical agents better than diathermy for heating internal tissues.

The Nobel prize in medicine and physiology was awarded to Dr. Carl F. Cori and his wife, Dr. Gerty T. Cori, Washington University School of Medicine, St. Louis, for their discovery of what happens to sugar and starch in the body, and to Dr. Bernardo A. Houssay, of Buenos Aires, for his discovery of the relation between the pancreas and the pituitary gland.

PSYCHOLOGY AND PSYCHIATRY

Hypnotizing Drug Used for Relief of Morbid Fear

PENTOTHAL, hypnotizing drug that helped soldiers recover from combat-induced mental sickness, was used for rapid relief of a civilian from his morbid fear of closed spaces.

New, safer form of electric shock treatment in which each pulse lasts only one-half to one-thousandth of a second was successful against depression; shock by weak electrical current followed by a deep, dream-like sleep was found useful.

Two personality tests, Rorschach ink-blot test and Minnesota Multiphasic Personality Inventory, were used to separate quickly curable mental patients from resistant ones.

Lack of sleep for five days and nights made a healthy young man temporarily "see things," laugh and talk crazily, and show other symptoms of the serious mental disease, schizophrenia, pointing to a relation between the two conditions.

Mental patients were found to have an average intelligence quotient eight points below the normal expectancy of 100, alcoholics and neurotics rated highest intellectually, epileptics and syphilitics among the lowest.

Inability to form new conditioned reflexes was used as a clue to serious brain damage, and to distinguish between functional disturbances and organic disturbances.

Children displayed more intelligence after treatment with glutamic acid.

Chemical constitution you inherited from your parents plus the environment in which you live was reported to determine whether you would become an alcoholic; alcoholic addicts were declared subconsciously to enjoy being treated badly.

Smell is not a chemical sense but is due to infrared radiation from the sense organ, according to a theory confirmed by experiments; odorous substances are those capable of absorbing radiation of the critical wavelengths—eight to 14 microns.

Tapping of electric currents from the eye itself was found to be an objective method for measuring visual sensitivity uncomplicated by what happens in the brain's visual centers.

Possibility that sounds may be used to produce an illusion of sight for the purpose of guiding a pilot into an airport was the outcome of war research.

Simpler instrument panels with fewer, less confusing dials and knobs easier to reach and manipulate also resulted from these programs.

GENERAL SCIENCE

Ten Top Science Advances

➤ THE TEN most important advances in science made during 1947, as picked by Watson Davis, director of Science Service, are:

1. Discovery that smell is detected by infrared radiation absorbed by odor material reaching the nose.

2. Pilotless plane that crossed Atlantic untouched by human hand at controls.

3. Attempts at artificial rainmaking through sprinkling dry ice or water on clouds under certain conditions.

4. Synthesis of protein in long-chain molecules, promising new plastics of medical and industrial importance.

An auditory afterimage was found to follow a buzzing sound of high intensity, causing familiar sounds to have a strange metallic quality.

A person's ear was reported to be more sensitive to interruptions in sound than his eye to a flicker in light, being capable of noticing the difference between a continuous noise and one interrupted 1,000 times per second; this research is important in new telephone systems.

Sight, except for responses to light, must be learned, it was shown through studies with baby chimpanzees raised in darkness and humans born blind in whom sight was restored.

Master hearing aid that will suit almost all deafened persons was made possible by war research on noise and communications.

Learning under intense pressure tends to be narrow and rigid so that a need to adapt under changed conditions results in frustration; this finding from animal experiments is believed to explain the psychological difficulties of men and nations.

Most accurate prediction of a man's leadership comes from the men who work with him, it was found, as intelligence, mechanical aptitude and personality tests fail to predict ability to command in combat.

Lefthandedness can be predicted while the person is still a baby from study of his posture in motion pictures made at monthly intervals, it was reported.

Punishment may stamp in the behavior for which punishment is given, it was indicated by studies in which rats punished for running often ran faster.

People begin to lose their strength at the age of 25, measurements of hand strength showed.

Although school books intended to build a child's vocabulary only introduce about 500 new words a year, the average child was found to add 5,000 new words to his vocabulary every year.

Two-thirds of the mothers bringing their babies regularly to a health clinic, and themselves learning a realistic and tolerant attitude toward infant behavior, reported their babies had no unapproved habits.

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Do You Know?

Alfalfa may some day be grown as a source of food for humans; it is rich in proteins.

The *frost* that forms on the freezing compartment of an electric refrigerator can be melted and used where relatively pure water is required.

Four methods of *air disinfection* for hospitals are recommended: ultra violet radiation, chemical disinfection with sprays, dust suppression, and ventilation.

Starting from sea-level, the *temperature* of the atmosphere drops steadily up to an altitude of about 12 miles, then remains constant for several miles, rising at an altitude of 36 miles and later dropping again.

Butyl alcohol, a possible *fuel* for automobile engines, is obtained from corn-cobs by a new process in which the cobs are treated with an acid, yielding glucose, or corn sugar, and xylose, once called wood sugar.

ENTOMOLOGY

New Unwetable DDT Will Provide Poisonous Film

➤ MOSQUITO "wrigglers" coming to the surface to breathe, also their mothers coming down to lay another clutch of eggs, are in for worse DDT trouble than ever. For covering the water surface there is very likely to be a persistent, poisonous film of a new "hydrophobic" DDT.

This does not mean that the mosquitoes will get hydrophobia; it merely means that the etymology of this new entomological woe indicates that the compound "hates water", in the sense that it cannot be wetted and thus washed out or sunk.

This new, unwetable form of DDT, on which U. S. patent 2,430,288 has been issued to a du Pont chemist, Albert L. Flenner of Wilmington, Del., is prepared by hooking the DDT molecules up to molecules of stearylamine, which are long-tailed affairs built somewhat like soap molecules, then mixing to a paste with tricalcium phosphate. Dried and re-powdered, this forms highly fluid dust, the particles of which stick to each other but will not stick to water. Hence their excellent film-forming properties.

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ASTRONOMY

Patches on Distant Star

Light and dark areas bearing some resemblance to sunspots have been observed for the first time on a star beyond the solar system.

► LIGHT and dark patches bearing some resemblance to sunspots have been observed for the first time on a star beyond the solar system, Dr. Gerald Kron, assistant astronomer in the University of California Lick Observatory, reports.

Actually, this is the first time surface features of any star beyond the solar system have been observed.

The patches—Dr. Kron says he is not yet prepared to say they are “star spots”—were observed on the smaller, sun-like star of AR Lacertae, a double star of the seventh magnitude. This star is in the Northern constellation of Lacerta, the lizard, found high in the northwest these winter nights.

The observations were made by means of photoelectric photometry, in which light from a star gathered in a telescope is translated into an electrical current by means of a photocell. This electrical current can be amplified and measured, giving an accurate measurement of the light received.

Astronomers call AR Lacertae an eclipsing variable, that is, a double star system in which the two components are constantly eclipsing each other when observed from the earth. One star is of the same type as the sun and about twice the sun's size. The other is a cooler star about three times the size of the sun. The two stars are about two million miles apart, 160 million light years from the earth, and revolve so rapidly about each other that the larger one totally

eclipses the smaller star once every two days.

During these total eclipses, Dr. Kron measured the amount of light received from the larger star. When the two stars were entirely separated, Dr. Kron measured the total light received from both stars. The amount of light received normally from the smaller star alone was determined by subtraction.

The astronomer noted a light variation for the whole system of about 10%. Having determined that there was no variation in the light received from the larger star when it was totally eclipsing the smaller one, he deduced that the variation must originate only from the small star. Eventually, he found the light variation in the smaller star to be about 20%.

Studies of these variations during five years of research, 1938 through 1940, and 1945 and 1946, showed that they must be caused by the appearance and disappearance of large bright and dark patches on the surface of the smaller star.

The patches form and dissolve, appear and disappear around the edge, and are eclipsed by the larger star, Dr. Kron said.

His evidence so far will not support the idea that these are “star spots” similar to sunspots. He said, however, that some similar phenomena may be operating on “suns” beyond the solar system, and that this might be such an instance

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core. This gives additional strength.

The covering sheets attached to the core may be thin metal, plywood, veneer or some other sheet material. Aluminum is successfully used. With modern glues, these covers can be bonded on so firmly that the glue joint may be stronger than the cover.

A special feature of sandwich construction is its strength. The panels, which may vary in thickness from a fraction of an inch to many inches, are stiff as well as strong, and can be used in a small house without supporting frame. Floors, partitions and ceilings may also be sandwich panels. Houses of sandwich-panel sidewalls will be warm if the proper types of panelling are selected.

The building erected by the government agency is frameless. Panels are held together by temporary joints so that different types of panelling can be substituted for tests. The house rests on a concrete foundation. In one room, without basement, the sandwich floor panels contain copper piping in the core for hot water heating by what is known as radiant heat. In another room, a wood floor is laid on sleepers over a concrete floor in which radiant heating piping is embedded.

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METALLURGY

Coat Nickel and Cobalt on Metal Without Electricity

► NICKEL and cobalt have been successfully plated on metal surfaces without the use of an electric current by a new process developed by the National Bureau of Standards.

The action is brought about by chemical reduction of a nickel or cobalt salt with hypophosphite in hot solution. The reaction is catalytic. No plating takes place unless certain metals, such as steel or nickel, are introduced into the bath. The reduction then occurs only on the surface of the immersed metal with the production of an adherent coating of about 95% purity.

These coatings are of good quality, sound though brittle, and are usually bright. As they can be made as hard as tool steel, the method may be useful where hard, wear-resistant surfaces are required. The process is particularly applicable to the plating of irregular surfaces.

The development is the work of Abner Brenner and Miss Grace E. Riddell of the Bureau's staff.

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ENGINEERING

Sandwich-Panel Houses

► SANDWICH-PANEL construction may soon enter the home-building field. An experimental three-room unit, just erected at Madison, Wis. by the U.S. Forest Products Laboratory, is designed to test the value of this type of factory-built material in housing.

Sandwich panels, first used in aircraft, are made of two thin sheets of wood or metal with a thick layer of light insulating material between, the whole being firmly bonded together with a

special glue. The inner layer, called the core, may be a light wood such as balsa, or it may be paper or even metal.

The favorite type is the honeycomb sandwich. In this the paper or other material in the core is shaped by special machinery to resemble the honeycomb formed by bees. This construction gives special strength and, because of the enclosed air spaces, provides heat insulation. One type of honeycomb construction uses very thin aluminum in the

ECOLOGY

NATURE RAMBLINGS

by Frank Thone



Will Toward Peace

★ PEACE ON EARTH was the promise that sounded through the sky on the first Christmas night, according to the Bible narrative. That to achieve it we must be men of good will is a condition which we are all too prone to forget. Indeed, a more recent translation makes the condition seem even more difficult, for it reads: "Peace on earth to men that are God's friends"

How shall we show ourselves men of good will? How become God's friends?

To act with good will must surely mean that we shall act in accordance with God's will. Any theologian will tell us that. Dispute begins when the theologians proceed to give us their varying formulae for learning what God's will is.

Leaving discussion of such matters to those competent in them, let us see if there is any common ground on the level of the natural world whereon we may grope our own way towards peace. If we accept the dogma that God made the

world, then surely it follows that the normal course of nature is one expression of his will. To act in accordance with that will, thus expressed, man as an inhabitant of the natural world should integrate his life with the general life of his fellow-creatures; in a word, man should become an ecological being.

He should, for example, be content to take what he needs for food and clothing and shelter, neither killing his lesser brethren "just for fun" nor piling up acquisitions in sheer ostentation. He should take care that the trees he cuts down are replaced with others, that the soil he plows and plants is well treated so that it will stay where it is and not flee down gullies or into the wind, that our rivers are made clean homes for fish, not mere giant sewers.

That we are not living as natural men of good will we scarcely need to be told again. We have been exploiters

rather than users, wasters rather than gainers. Arrogating to ourselves the title of lords of the universe, we have behaved in altogether too lordly a manner.

True, in the beginning man was bidden to subdue the earth, and given "dominion over the fish of the sea, and over the fowl of the air, and over every living thing." But we have misinterpreted dominion to mean tyranny and wanton waste. The evil consequences of our course, in want and war, are now spread plain before us.

Ecologists, like the prophets of old, tell us these things every day, and make it clear what we can expect if we persist in our stiff-necked selfishness. Like the milder prophets, they also tell us that there is yet time to repent and return to the right path toward peace. There is time, but there is not much time.

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MEDICINE

Test for Hypertension

Curing of high blood pressure due to adrenaline-producing tumors will be possible by surgical removal of the growth following diagnosis with this new test.

➤ A NEW test for high blood pressure which gives doctors "the rare opportunity of truly curing" the condition is announced by Drs. Marcel Goldenberg and Henry Aranow, Jr., of New York and Dr. C. Harrison Snyder of Salt Lake City in the *Journal of the American Medical Association* (Dec. 13).

The high blood pressure for which the test was devised is that due to tumors which produce adrenaline, or epinephrine. These tumors may be located on the part of the adrenal glands that normally produces adrenaline, or they may be located elsewhere in the body. Surgical removal of the tumor cures the condition.

A 13-year-old girl and a 42-year-old woman have already been picked out by the test and cured by removal of tumors.

In high blood pressure from this cause, adrenaline is found circulating in the blood. It is the only clinically important high blood pressure known to be due to adrenaline circulating in the blood.

The condition probably occurs more often than is realized. The diagnosis has been difficult to make, because the

symptoms are so much like those of the high blood pressure doctors call "essential" or "malignant." X-rays frequently fail to show the tumor before operation.

The new test for this high blood pressure is made with a relatively new drug, known as 933F. Its chemical name is piperidylmethyl benzodioxane. It was first prepared by Drs. E. Fourneau and D. Bovet of the Pasteur Institute in France.

This new drug blocks the action of adrenaline. When injected into the veins of a patient with high blood pressure, his blood pressure promptly falls if it was high because of adrenaline from the tumor. If his high blood pressure is due to another cause, it goes still higher when 933F is injected. Persons with normal blood pressure also show a heightened blood pressure after injection of 933F.

The effect of 933F on the blood pressure is temporary, lasting about 15 minutes.

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If copper or brass strainers are used for citrus or tomato juices the vitamin C content of the juices may be destroyed.

YOUR HAIR AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as Dandruff — gray hair — thinning hair — care of the scalp — baldness — abnormal types of hair — excessive oiliness — brittle dryness — hair falling out — infection — parasites — hair hygiene, etc., etc.

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PYROTECHNICS—George W. Weingart—*Chemical Publ. Co.*, 2nd ed., 244 p., illus., \$7.00.

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RESEARCHES OF THE DEPARTMENT OF TERRESTRIAL MAGNETISM Vol. XII—*Carnegie Inst.*, Publication 175, 397 p., paper, \$1.85. Part I covers "Ionospheric Research at College, Alaska July, 1941-June, 1946;" Part II surveys "Auroral Research at College, Alaska 1941-1944"

A STUDY OF THE FEI BANANA AND ITS DISTRIBUTION WITH REFERENCE TO POLYNESIAN MIGRATIONS—L. H. MacDaniels—*Bernice P. Bishop Museum*, Bulletin 190, 56 p., pictures unpag., illus., paper, \$1.00

SUCCESSFUL PART-TIME FARMING—Haydn S. Pearson—*Whittlesey House*, 322 p., illus., \$3.00 Tells what equipment is necessary, and which crops and crafts are adapted to part-time farming.

TECHNICAL AERODYNAMICS—Karl D. Wood—*McGraw-Hill*, 2nd ed., 472 p., illus., \$5.50. An advanced course, presupposing considerable background.

TERMINAL RESEARCH REPORTS ON ARTIFICIAL LIMBS Covering the Period from 1 April 1945 Through 30 June 1947—Committee on Artificial Limbs, *National Research Council*, 95 p., illus., paper, free from publisher at 2101 Constitution Ave., N. W., Washington, D. C.

TIME AND THERMODYNAMICS—A. R. Ubbelohde—*Oxford Univ.*, 110 p., \$2.25. The trend of events in time, as measured by the concept of entropy.

TUAMOTUAN RELIGIOUS STRUCTURES AND CEREMONIES—Kenneth P. Emory—*Bernice P. Bishop Museum*, Bulletin 191, 102 p., illus., paper, \$2.00.

ZACULEU. Restoration by United Fruit Company—*Middle America Information Bureau*, 31 p., illus., paper, free from publisher at: Box 93, Lenox Hill Station, New York 21, N. Y. Report on archaeological explorations and research on this Mayan community in Guatemala

Science News Letter, December 20, 1947

BIOCHEMISTRY

Atom Explosion Does Not Affect Life on Bikini

See Front Cover

➤ A NAVY expedition to Bikini last summer found little change in the life of the island. Seemingly ignoring man's destructive weapon, the atom bomb, the giant man-killing clam on this week's cover of the SCIENCE NEWS LETTER is growing on a Bikini reef. The clam *tridacna*, is approximately two feet across and was photographed underwater. Few people have seen it alive; it is the dread of pearl divers because it is likely to clamp onto their leg, causing drowning. (See also p. 391 and SNL, Nov. 29).

Science News Letter, December 20, 1947

A giant healthy sponge found a few years ago in Tortugas had within it over 16,000 shrimp and thousands of lesser animals, all living on food in the water sucked in by the sponge to get food for itself.



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• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D C and ask for Gadget Bulletin 393. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **WALLPAPER**, with an outer surface of an extremely thin cellulose acetate plastic coating, can be cleaned of stains and smears without injury. A damp cloth, soap and water, or non-abrasive standard household cleaning preparations can be used.

Science News Letter, December 20, 1947

⚙️ **TINY TESTER**, vest-pocket size, will check all types of batteries used in hearing aids. This electrical measuring instrument, in its black plastic case, has a one-inch miniature movement constructed of the highest quality materials.

Science News Letter, December 20, 1947

⚙️ **RUBBER MATS**, eight feet square, are manufactured for use in apple orchards to prevent bruising of the fruit that accidentally falls to the ground during picking. It is a sponge-like rubber, honeycombed with tiny nitrogen-filled spaces.

Science News Letter, December 20, 1947

⚙️ **MITTENS** for children to keep their hands warm and dry while playing in the snow have linings of flannel and outside covers of red rubber. Already tested in use by a group of children, they are found satisfactory and have long life. They are made in three sizes.

Science News Letter, December 20, 1947

⚙️ **FISH LURE** that makes bubbles as it is drawn through the water similar to those made by live bait, has a cavity to hold a tiny capsule containing baking soda and powdered citric acid. The water causes the chemical reaction that releases the bubbles.

Science News Letter, December 20, 1947



⚙️ **HYDROPLANE** model, shown in the picture, is built from a kit around a plastic hull, all parts being $\frac{1}{16}$ -drilled to assure a perfect fit. It is powered by a tiny gasoline engine in an aluminum cowling. Pliers, screwdriver, file and countersink are the only tools needed to put the boat together.

Science News Letter, December 20, 1947

⚙️ **RECTIFIER**, to change household alternating electric current into direct current to operate an electric razor, is a small electronic device with plugs to fit wall outlets and into which the razor cord is plugged. It gives the steady direct current on which some claim these shavers work best.

Science News Letter, December 20, 1947

⚙️ **WELL DRILLER**, designed for homeowners outside city water districts,

is a simple type operated by electric motor or gasoline engine which can be used by an untrained operator.

Science News Letter, December 20, 1947

RADIO

Science Service Radio Talks Over CBS Resume

➤ THE Saturday afternoon radio programs of Watson Davis, director of Science Service, will be resumed over the nationwide network of the Columbia Broadcasting System on Saturday, Dec. 27, at 3:15 p.m. EST. The first program since the annual interruption due to football will be from the AAAS meeting at Chicago. Each Saturday highlights of science news and comment and guest speakers will be presented.

Science News Letter, December 20, 1947

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Question Box

AERONAUTICS

What is the latest development in jet planes? p. 387.

ASTRONOMY

What clue has been found to determine a star's speed? p. 386.

What has been observed for the first time on a distant star? p. 397.

Photographs: Cover, J. I. Tracey of U. S. Geo. Survey and Navy; p. 387, Navy; p. 389, United Airlines; p. 390, U. of Nebraska; p. 391, U. S. Naval Electronics Lab.; p. 393, U. S. Forest Prod. Lab.

EMBRYOLOGY

What proportion of water is a newborn baby? p. 386.

MEDICINE

What hope lies in the new test for high blood pressure? p. 388.

What new treatment of cancer will get a nation-wide trial? p. 387.

MINERALOGY

How were minerals produced in the laboratory? p. 386.

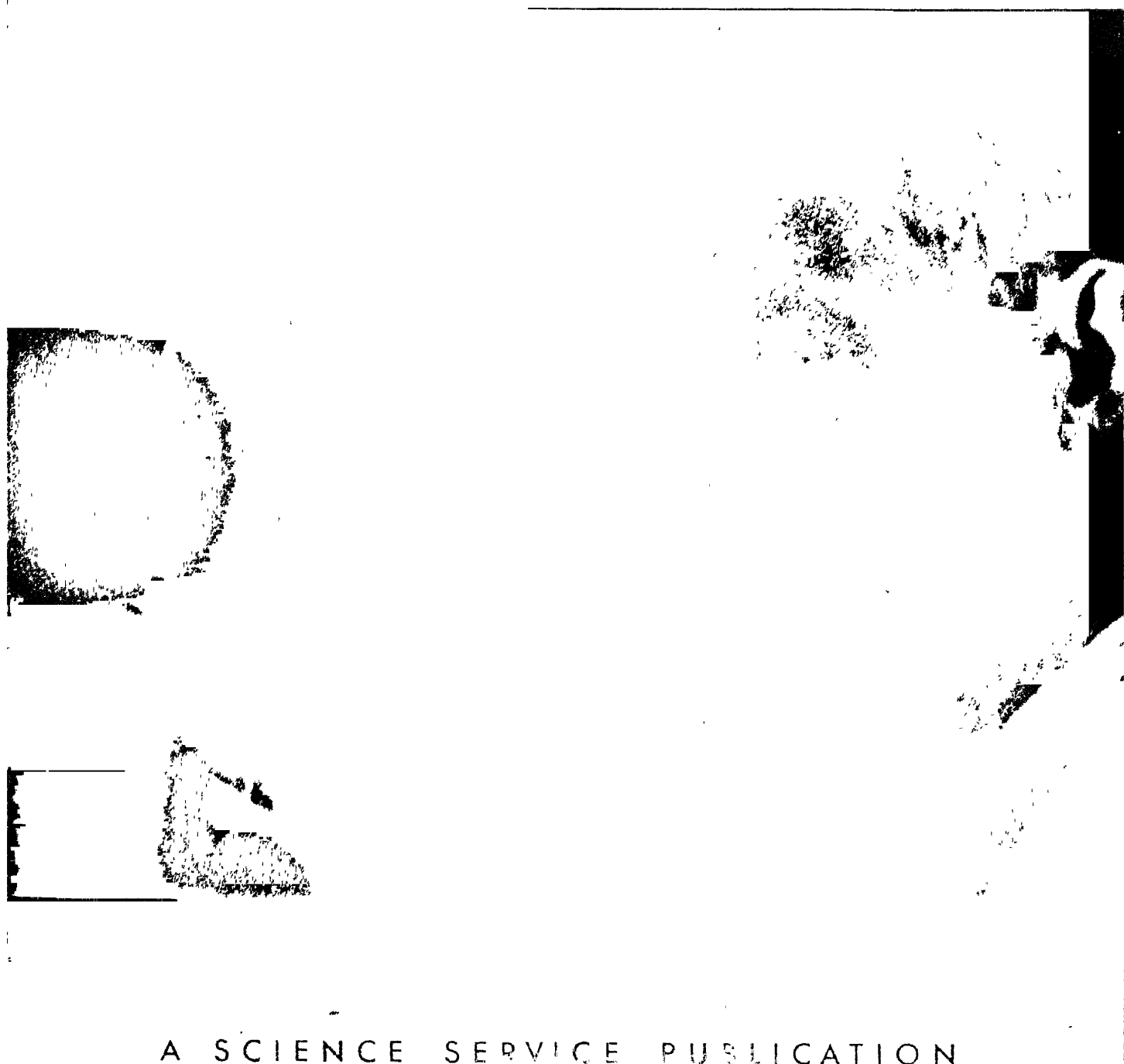
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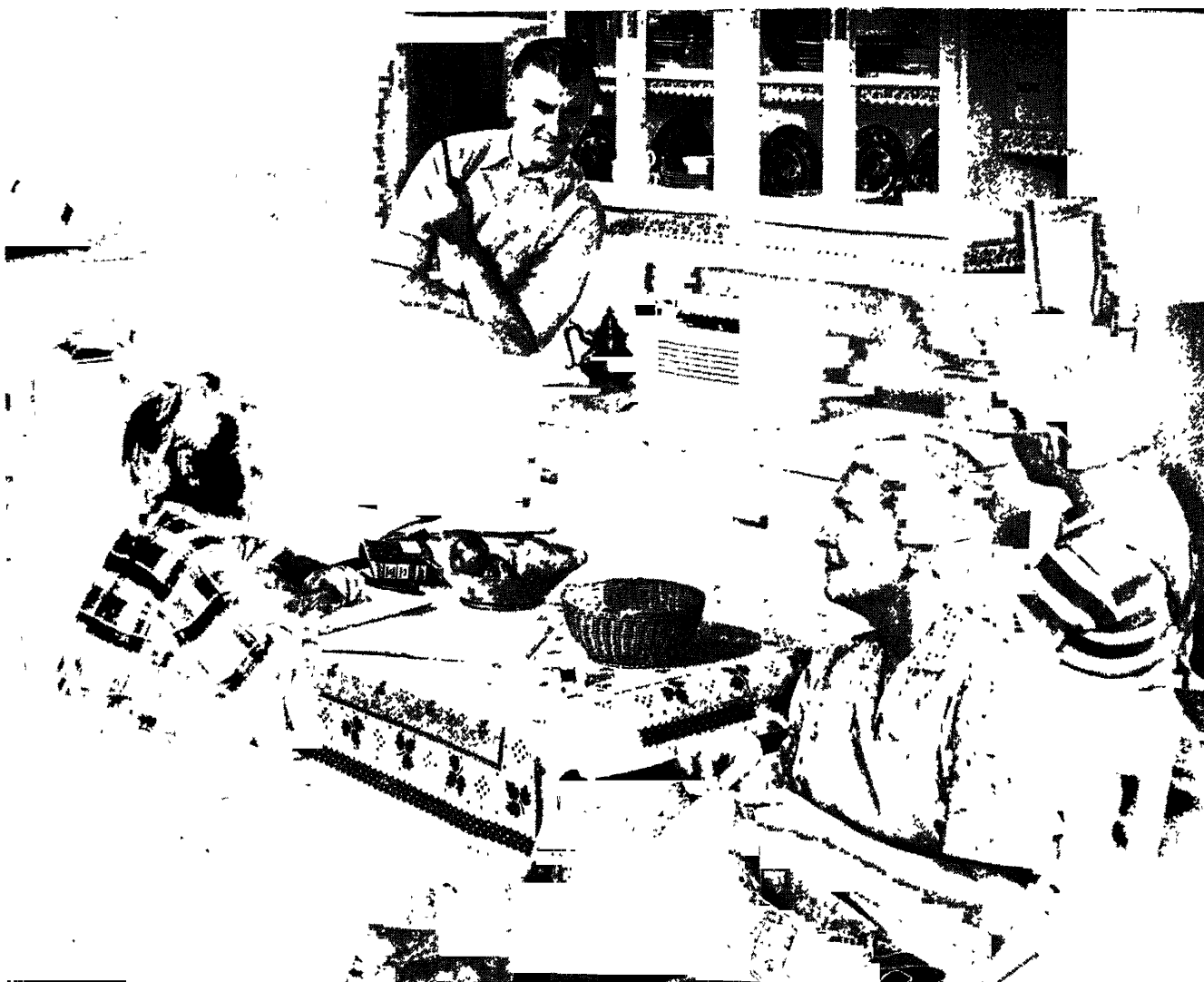
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SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION



"Our American concept of radio is that it is of the people and for the people."

Freedom to LISTEN – Freedom to LOOK

As the world grows smaller, the question of international communications and world understanding grows larger. The most important phase of this problem is *Freedom to Listen* and *Freedom to Look*—for all peoples of the world

Radio, by its very nature, is a medium of mass communication, it is a carrier of intelligence. It delivers ideas with an impact that is powerful . . . Its essence is freedom—liberty of thought and of speech.

Radio should make a prisoner of no man and it should make no man its slave. No one should be forced to listen

and no one compelled to refrain from listening. Always and everywhere, it should be the prerogative of every listener to turn his receiver on or off, of his own free will.

The principle of *Freedom to Listen* should be established for all peoples without restriction or fear. This is as important as *Freedom of Speech* and *Freedom of the Press*.

Television is on the way and moving steadily forward. Television fires the imagination, and the day is foreseen when we shall look around the earth from city to city, and nation to nation,

as easily as we now listen to global broadcasts. Therefore, *Freedom to Look* is as important as *Freedom to Listen*, for the combination of these will be the radio of the future.

The "Voice of Peace" must speak around this planet and be heard by all people everywhere, no matter what their race, or creed, or political philosophies.*

David Sarnoff

President and Chairman of the Board,
Radio Corporation of America

*Excerpts from an address before the United States National Commission for UNESCO.



RADIO CORPORATION of AMERICA

FREEDOM IS EVERYBODY'S BUSINESS

PHYSICS

Ideal Standard of Length

Mercury made by neutron bombardment of gold produces a light wave which is most precise standard of length yet devised.

See Front Cover

➤ MERCURY, made from gold in the atomic pile by neutron bombardment, has now been obtained in large enough quantities to perfect methods of measurement by the most precise standard of length yet devised. This unit is a single wave of green light from a form, or isotope, of mercury with an atomic weight of 198 and, therefore, known as Mercury 198.

Research laboratories for a number of years have been using light waves for special types of length measurements, but the use of this isotope known as Mercury 198 provides precision not available before. The National Bureau of Standards, which now has Mercury 198 in reasonable quantities and has developed practical methods for its use in measurements, states that the discovery makes possible an "ultimate standard of length." The legal standard is a meter bar kept in the vaults of the Bureau.

University of California scientists announced the process a year ago. It was by means of a cyclotron at the university that gold was transmuted to Mercury 198. Quantities obtained were very small. The Bureau's work, carried out by Dr. William F. Meggers, is a refinement of other processes plus the development of mercury lamps and measuring procedures.

Measurements based on this mercury green light wave, which is 21 millionths of an inch long, will make possible length determinations precise to one part in 100 million. Such precision in the measurement of length has never before been attained by man, Dr. E. U. Condon, director of the Bureau, declares.

The advantages of a light-wave standard over a physical standard are that it is indestructible and exactly reproducible, he says, and that any laboratory with the necessary auxiliary equipment can have a basic standard on the premises.

Cadmium red radiation was adopted provisionally at the 1927 International Conference on Weights and Measures as

a wavelength standard. The fundamental advantage of Mercury 198 over cadmium is that it emits a more nearly perfect monochromatic light. By this is meant that the red, green, or other color used, is a single wavelength rather than multiple wavelengths extremely close together.

Cadmium consists of six principal isotopes that radiate slightly different waves. Other advantages of mercury are that it does not need special heating equipment as does cadmium, and that the human eye is seven times more sensitive to green light than to red.

Dr. Meggers is now experimenting with a number of lamps for using the mercury. The simplest is a glass tube the size of a cigarette with Mercury 198 sealed inside it. When excited by high-frequency radio waves, the mercury

glows and gives off energy in the form of light as shown on this week's cover of the SCIENCE NEWS LETTER. The Bureau expects at a later date to have lamps of this sort available for other scientific laboratories.

Science News Letter, December 27, 1947

AERONAUTICS

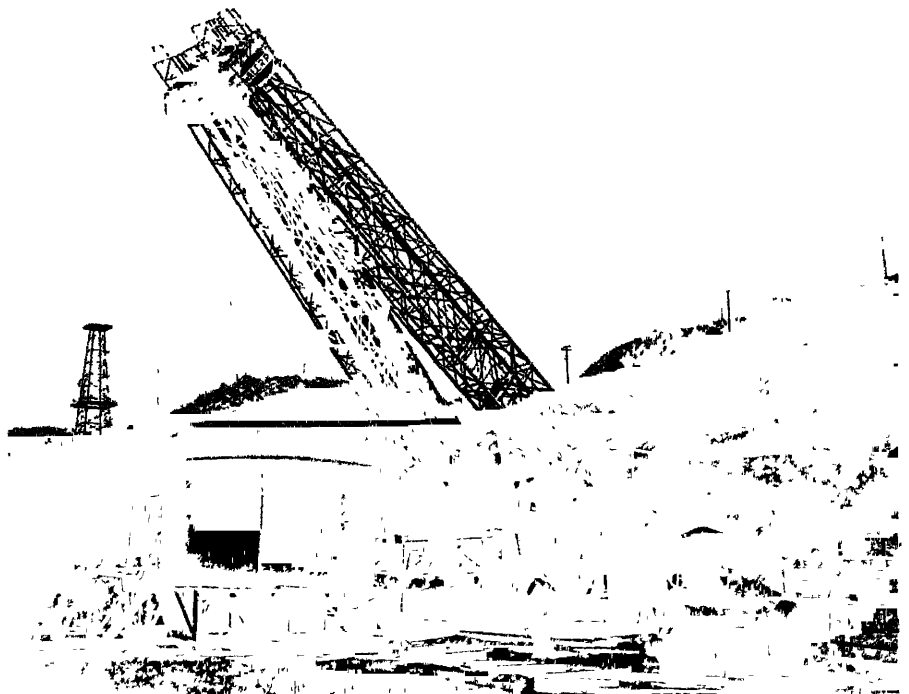
Skyway for Private Planes Links Canada and Mexico

➤ A SECOND skyway for private planes is planned by the Civil Aeronautics Administration. It is a 40-mile-wide route from Canada to Mexico, extending first from Pembina, N. D., to Laredo and Brownsville, Texas, but eventually from Winnipeg to Mexico City.

The skyway is intended solely for visual flying, and its use will keep private planes off commercial airlines and promote safety in the air. An airmarking program along the southern end of the skyway is already under way.

This route, to be known as Skyway Eleven, is the second airway for private planes sponsored by the CAA. The first, Skyway One, extends from Washington, D. C., to Los Angeles.

Science News Letter, December 27, 1947



PORTABLE DERRICK—This first completely portable electric oil well drilling rig is capable of boring two miles into the earth. Weighing 18 tons, its twin-masted derrick reaches as high as a 12-story building. It can be telescoped, folded and moved along the highway, which is expected to check rising drilling costs and increase the rate of well completions.

MEDICINE

New Approach to Malaria

Tetanus toxoid, given in conjunction with anti-malarial drugs, stimulates the body's defense forces against the disease.

➤ A NEW approach to the world-wide fight against malaria has been discovered by Dr. Eusebio Y. Garcia, senior malariologist of the medical research clinic at Binan in the Philippines.

Bouts of chills and fever did not come back as soon to plague the malaria victim when he was given, along with atabrine or chloroquine, doses of tetanus toxoid, Dr. Garcia found.

Tetanus toxoid is the detoxified poison of the tetanus, or lockjaw, germs. Members of the U. S. armed forces during the war knew it as one of the many "shots" given them for protection against diseases they might encounter. Modern mothers know it is given their babies along with shots against diphtheria and

whooping cough, so that when Junior steps on a nail he will be protected against the lockjaw danger grandmother feared from stepping on nails.

News of Dr. Garcia's work comes to American scientists through the New York Academy of Sciences which has awarded him a \$200 A. Cressy Morrison prize for it.

The use of tetanus toxoid is different from chemical, or drug, treatment of malaria and different, also, from use of germ chemicals, such as penicillin, to fight other germs in the body. Tetanus toxoid, he believes, acts as a stimulator to the body's own defensive forces. Immune mechanisms is the term scientists use for these defensive forces. They are

stimulated and enhanced, he thinks, by the tetanus toxoid, so that relapses in malaria patients after treatment do not come as often.

The significance of Dr. Garcia's work lies in the fact that he is using tetanus germs, which are bacteria, to fight germs which are protozoa and completely out of the bacterial germs' class. It is something like using a featherweight to stop Joe Louis, only more so because the bacteria and the protozoa are as different as plants and animals. Dr. Garcia's results are said to be the first successful attempts to check multiplication of protozoan parasites by stimulating immune mechanisms through a bacterial product.

Science News Letter, December 27, 1947

SCIENCE NEWS LETTER

Vol. 52 DECEMBER 27, 1947 No. 26

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOOrth 2255. Edited by WATSON DAVIS

Subscriptions—\$5.00 a year; two years, \$8.00, 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index

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MEDICINE

Painless Shots Possible

By chilling the skin with a new metal applicator, it is possible to block the pain sensation felt by patients while getting injections.

➤ THE needle really won't hurt next time you get a shot of penicillin or some other hypodermically-injected drug if your doctor uses a method devised by three Harvard Medical School surgeons.

The method is to chill the skin briefly to about a freezing temperature before sticking in the hypodermic needle. The chilling is done with a pre-chilled metal applicator of about one-third to one-half inch diameter at its business end. The chilling does not hurt and does block the pain sensation felt by many patients, especially sick children, when the needle is pushed through the skin.

The chilling applicator and its successful use are described by Drs. Franc D. Ingraham, Donald D. Matson and Robert P. Woods in the *New England Journal of Medicine* (Nov. 20).

After trials with carbon dioxide snow, they developed a simple instrument consisting of a brass cylinder about nine inches long and about two inches in diameter. This is closed at one end, and

to the closed end is soldered a smaller brass cylinder. This smaller cylinder which becomes the business end of the instrument, is filled with solder, which is a rapid conductor of heat. The larger cylinder is wrapped with felt and filled with cracked ice to which anhydrous calcium chloride is added. A cork closes it. The contact end of the small cylinder is covered with a closely fitting hollowed-out rubber cap. For use, this rubber cap is removed, the end is wiped clean with alcohol or other antiseptic, and then applied for about 45 to 60 seconds to the previously cleansed skin where the hypodermic injection is to be given.

The instrument can also be used to kill the pain of the needle when blood is taken from a vein in the arm. It is not satisfactory, however, for injections of local anesthetics, presumably because the anesthetic fluid when injected stimulates different nerve endings in the skin from those made insensitive to pain by the chilling.

Science News Letter, December 27, 1947

PSYCHOLOGY

Planning Ability Impaired

Worry-relieving operation in mental patients has been found to affect the intelligence. If this surgery was done universally it would end all progress.

➤ MENTAL patients who undergo a surgical operation designed to cut out worry and relieve depression suffer a loss of their ability to thread their way through a printed maze, such as those commonly used in children's puzzles.

That the fairly common operation, called lobotomy, impairs this kind of ability to look ahead to the end of a road before making a turn, was discovered through study of 55 patients at the Kamehameha Hospital for the Insane on Oahu Island in Hawaii. Details are reported by Drs. Stanley D. Porteus and Henry N. Peters in *Genetic Psychology Monographs*.

Doctors have thought previously that the operation did not damage intelligence, because testing with other kinds of mental tests had failed to show up any impairment. The present study indicates that 81.8% scored lower on the maze test than they did before the operation. This, Dr. Porteus points out, does not represent the total loss in this type of intelligence because it is not known just how high the patients would have scored before they became ill.

Ordinarily, normal persons improve a great deal with practice on this maze test—so much so that it cannot be used for repeated testing. Tests on a group of criminals made for comparison with the patients showed that this improvement from practice lasts as long as four and a half years. This makes the lowering of scores of the operated patients all the more striking.

After a lapse of time, the patients gradually regain their losses, especially those whose mental disease symptoms have improved most. This fits in with what psychologists would expect, if the work of the severed nerve connections between the frontal lobes and other parts of the brain was gradually taken over by other nervous pathways.

Dr. Porteus believes these findings important not only from the point of view of how the operation affects the intelligence, but also as throwing light on the function of the frontal lobes of the brain. He now believes they are concerned chiefly with the ability to plan ahead, or foresight, apparently tested by the maze.

"There is a marked diminution in planfulness, and after varying intervals of time many of the patients recover this planfulness to a greater or lesser degree; some, however, hardly improve at all or the improvement is masked by the return of the psychotic behavior.

"Undoubtedly, because of these early and severe deficits, if everyone in the world were to be simultaneously lobotomized it would spell the end of all progress. Industry, except at the simplest levels, would cease. A population of 'cheerful drones' could hardly carry on the complex business of modern living. It is doubtful indeed whether human survival would be possible except at the most primitive levels and in the most favorable environment."

Science News Letter, December 27, 1947



AUTOMATIC PILOT—This new, light-weight, all-electric pilot, normally mounted between the pilot and co-pilot, keeps the plane automatically on the radio beam. It was recently developed by the G-E Marine and Aeronautics Engineering Division for the Navy Bureau of Aeronautics.

cancer comes from the National Cancer Institute of the U. S. Public Health Service, Washington. For the first time in its 10-year history, the National Cancer Advisory Council has been asked for and has granted funds for cancer-fighting across the seas.

The sum of \$13,380 goes to Dr. A. Lacassagne at the Pasteur Institute in Paris. It will be used to create new organic chemicals, some of them tagged with atoms of radioactive elements, and to study their cancer-causing action and their effects on the sex and other endocrine glands. A relation between breast cancer and sex hormones, now being turned to use in hormone treatment of hopeless cancer patients, was long ago studied by Dr. Lacassagne. He is now, it appears, going to search further into the fundamentals of this relation.

At Hebrew University in Jerusalem, Dr. L. Doljanski will try to discover the chemical nature of substances extracted from living body tissues that promote the growth of cells. And he will study the effects of X-rays, radium, dyes, narcotic drugs and many other known chemicals on the division of cancer and normal cells. A sum of \$10,000, in two grants, has been awarded him to aid these studies.

For the first time, also, National Can-

MEDICINE

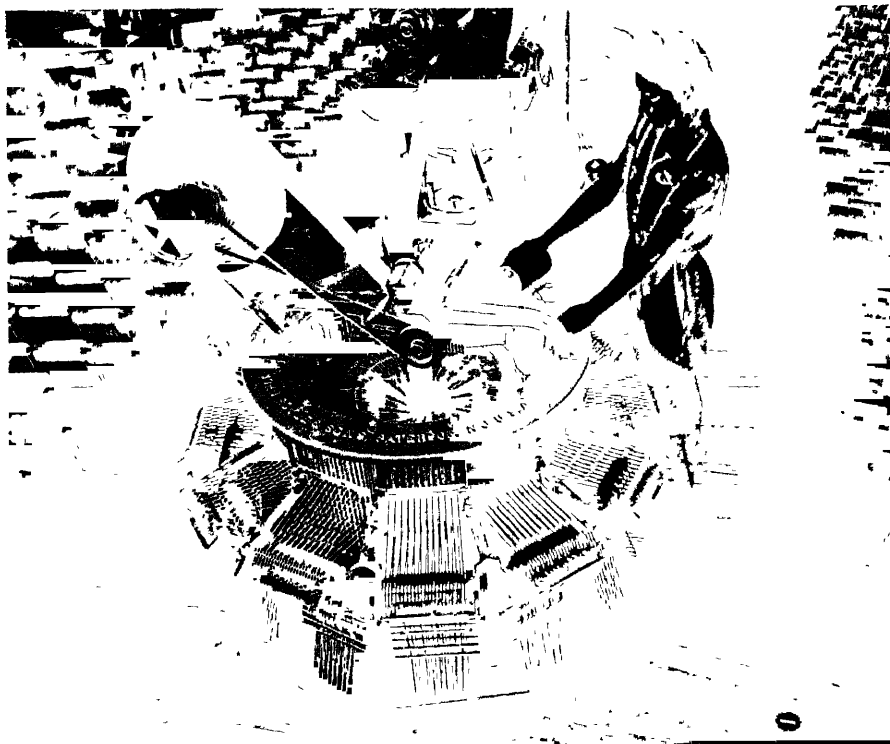
Cancer Funds Cross Seas

Grants were made by the U. S. National Cancer Institute for the first time to overseas researchers to promote international attack on the disease.

➤ A NEW kind of international search for important war secrets is on. Radioactive chemicals from the atom pile will be used. But the war will be against that common enemy of mankind, cancer.

The secrets concern the relation between the structure of certain chemicals and their ability to cause cancer and to affect the division of both normal and cancer cells in the body.

News of this international attack on



INTRICATE WEAVING—This machine takes miles of cotton cord from scores of spools and weaves it into a jacket for a fire hose. If laid in a straight line, the cord in a 50-foot section of this jacket would extend 10 miles.

cer Institute funds will go to dental schools. The first signs of cancer in the mouth may often be detected by the dentist when he examines a patient's teeth. The grants to the dental schools will help more dentists learn to recognize cancer in its early, curable stage.

Mice play an essential part in the fight against cancer because in their small bodies and short lifespans scientists learn much that helps human can-

cer patients. One of the world's biggest and most important centers for breeding pedigreed mice was destroyed, with almost 100,000 mice, when the Jackson Memorial Laboratory at Bar Harbor, Me., was burned in a forest fire this fall. For rebuilding the institution and overcoming as fast as possible the bottleneck in cancer research caused by the destruction of the mice, the council has granted \$250,000.

Science News Letter, December 27, 1947

GENERAL SCIENCE

Industry's Support Needed

Basic research and science education should not be left to government financing for it might mean political control, according to George A. Sloan.

➤ **INDUSTRY** was challenged to provide major support of scientific research and higher education or suffer the consequences of a decline of the basic new knowledge and manpower upon which its progress is based.

Addressing the New York Academy of Sciences, George A. Sloan, president of the Nutrition Foundation, declared

that if industry does not supply both the push and the money for both basic research and science education, and financing is left to government, "political control may gain a disastrous foothold inside the laboratories where men are and should be simply and sincerely seeking after truth."

Industry's support of scientific investi-

gations will not be closely restricted to the direct interests of industry, Mr. Sloan promised, judging by the experience of the Nutrition Foundation, an organization of large food industries, which spends hundreds of thousands of dollars on fundamental research.

One of the results of this nutrition research has been the appraisal of a new vitamin of the B group that is important in protecting against anemia.

Every discovery of modern science opens many new avenues for continued investigation, Mr. Sloan said, citing "new knowledge which will harness nuclear fission to more productive uses than war."

"Night after night most of us are subjected to the flashings of multitudes of neon signs," he said. "We are apt to consider them as the device of some smart advertising man. We fail to realize that this commercial device is merely the adaptation of scientific studies having to do with the nature of electrical conduction in gases. Had it not been for the basic study of the pressure, volume, temperature relationships of gases, there would be no neon gas available for exploitation."

"The modern vacuum tube is a marvelous device, performing all sorts of services for mankind, contributing in a thousand ways to industrial and social progress. It was perfected by painstaking scientific work in industrial laboratories, but its roots go back to fundamental investigations which were not directed primarily toward commercial application."

"Similarly, our modern systems of mechanical refrigeration owe a great debt to the study of vapor pressure and the long and careful development of the laws of thermodynamics which long preceded the clever adaptations that, in due time, translated these matters into everyday servants."

Science is of political, economic, and social importance due to the fact that it is essential for the prosecution of modern war, Prof. W. A. Noyes, Jr., University of Rochester chemist and past-president of the American Chemical Society, told the Academy.

It is high time that scientists took a greater interest in the cause of peace, Prof. Noyes declared, explaining that UNESCO is the international organization that holds real promise of raising the scientific level throughout the world.

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A railway in Norway now crosses the Arctic Circle.

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ERRATA, Vol. 52, Nos. 1-26, July-December, 1947

PAGE	TITLE BEGINS	CORRECTION
21	Dandelion Survivors	Col. 3, line 20, fuses for faces.
23	Radar Now	Line 1, Radio direction finding for radar Par 2 lines 1 and 2 should read Radar can pick up thunderclouds Line 4, The direction finder is for It is also
34	Inhaling Amyl Nitrite	Line 2, title, Siege for Seige
68	Cancer Weapon Hunt	Par. 4, line 5, delete to the treatment. Insert in the prophylactic or therapeutical treatment of cancer Last line, Frederick for Frank.
78	Sweeter Sweetcorn	Col. 2, line 13, delete Their sugar content increases during the ripening process.
108	1947 Record Comet Year	Line 6, delete new.
117	Caption	For steam shovel read excavator.
140	Deaths from Clots	Line 1, after embolism insert in medical patients.
163	Cell Shell Is Cancer Clue	Par. 3, line 3, Aug. for Sept.
198	New Uses for Sand	Siloxane ring is analogous to paraldehyde ring
215	Big Fans Protect Fruit	Par. 2, line 4, Oxnard for Oxford.
240	Thyratron Tube	Line 1, mercury vapor for vacuum
260	War on Cholera	Par. 2, lines 4-5, Nasis Bey for Dr. Bey.
267	No Planets in Evening	Col. 2, lines 4-5, 3:48 p.m. for 10:48 a.m. and 2:21 p.m. for 9:21 a.m.
295	Cornstalks Yield Sugar	Par. 4, line 3, read been discarded as for never been considered.
386	Find Clue	Col. 2, line 7, 4,000 for 5,500.

ASTRONOMY

Venus, Mars, Saturn Now Seen

Mars, distinguished by its red color, will exceed Saturn in brilliancy by more than three times as it approaches the earth. Venus is brightest planet.

By JAMES STOKLEY

➤ THREE bright planets can be seen in January evenings, two of which are shown on the accompanying maps. These give the appearance of the heavens around 10 o'clock at the beginning of January and an hour earlier in the middle. Toward the east, in the constellation of Leo the lion, are shown Saturn and Mars. Mars, the lower, which is distinguished by its red color, is about one and a third times as bright as Saturn. Until mid-February, Mars will approach the earth and get still brighter, until in brilliance it exceeds Saturn by more than three times.

Our third planet is Venus, which sets about two hours after the sun, toward the southwest, and so is gone by the times for which the maps are prepared. It is many times brighter than either Mars or Jupiter, so there is little doubt about which it is Venus, in fact, appears long before any other star or planet. Its magnitude, minus 3.4 on the astronomer's scale in the first part of January, makes it some 20 times as bright as Mars.

Jupiter Now a Morning Star

As for the other planets, Jupiter is now a morning star, in the constellation of Ophiuchus, the serpent bearer. It rises about two hours before the sun. Mercury is too close to the sun's direction during most of the month to be seen at all, but toward the end of January it will be swinging eastward from the sun, so that in early February it may be glimpsed low in the west just after sunset.

As always in this time of mid-winter, the brightest stars to be seen in the evening are those in the south around the familiar figure of Orion, which can easily be identified with the aid of the three stars in a row that form the belt of the celestial warrior.

Above the belt is first magnitude Betelgeuse, and below is Rigel. Directly below this star, supposed to mark one of the warrior's feet, is an inconspicuous

constellation called Lepus, the hare, but next to it, toward the left, we find Canis Major, the great dog. This contains the brightest star of the night-time sky—Sirius, the dog star. This is not as bright as Venus, but that body, of course, is a planet, a member of the same family as the earth, including the dark bodies that revolve around the sun and are visible only by the sunlight they reflect to us. Sirius and the other stars are themselves suns, glowing globes of gas shining with their own luminosity.

Lesser Dog Constellation

Above Sirius, and a little farther east (left) is another dog, Canis Minor, the lesser dog, in which the star Procyon shines. Above this group we come to Gemini, the twins, with Castor and Pollux. Directly south as shown on the map of the southern skies, and opposite to Orion from Sirius, is Taurus, the bull, containing the star Aldebaran, red in color, and marking the bull's eye.

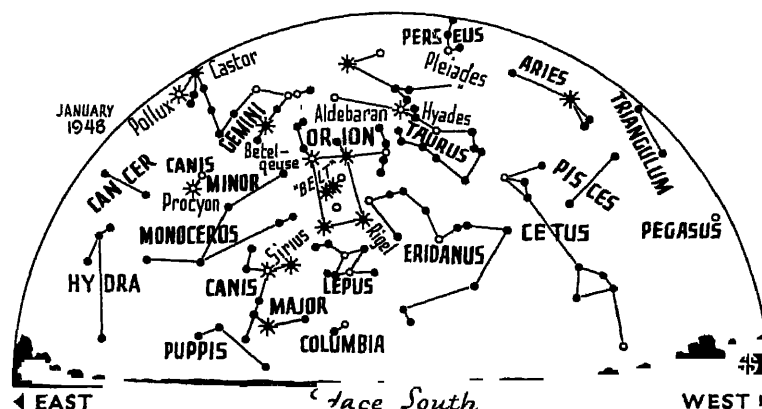
Nearly overhead we see Capella, in Auriga, the charioteer. As we descend toward the northern horizon we come to the pole star, in Ursa Minor, the lesser bear. Around this we find the familiar constellations of the northern sky that never go below the horizon, Draco, the dragon; Ursa Major, the great bear (of which the great dipper is part), Cassiopeia, the queen, and her husband, Cepheus.

Low in the east is Leo the Lion, of which the first magnitude star Regulus is a member, though it is now too low to be seen in its full brilliance. And also this group is the temporary home of Saturn and Mars.

Since the moon and planets all move through the same part of the sky, each month the moon passes each of the planets. Thus, on the evening of Jan. 13, at 11:25 p.m. (EST), it passes Venus, well to the south. On the evening of the 26th (at 11:39 p.m., EST) it passes Saturn, an even greater distance to the north. Early the next morning (12:34 a.m., EST) it passes Mars, but this time much more closely. In fact, people in the northern part of the United States and eastern Canada will be able to see an occultation, in which the moon actually hides the planet for a time. This is the first of a series of such occultations of Mars in 1948, some of which will be much better than the one this January. That coming on the evening of Sept. 6, for example, will be seen all over the United States.

Mars Coming Near Earth

This is not the only interesting thing about Mars during 1948. It is going to come closer than it has for several years. On Jan. 1 it will be some 83,356,000 miles from the earth, but it is drawing closer and closer. In the middle of February, it will be directly opposite the sun, and then Mars and the earth will be only 63,019,000 miles apart. This may not seem a short distance, but for Mars it is a fairly close approach, although at rare intervals it can come to within



☼ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

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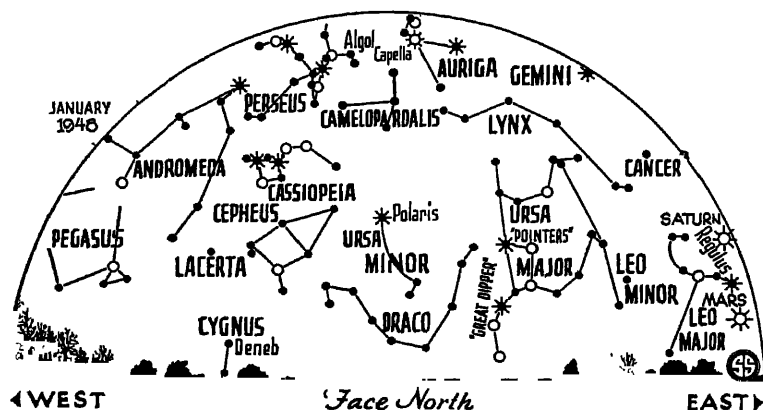
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about 35,000,000 miles. Thus the red planet will be unusually bright, and astronomers who make a specialty of planetary observations will have their telescopes trained on it steadily.

Other events on the list for 1948 include three eclipses, but none of them are particularly exciting to the astronomers. The first comes on April 23, when the moon is partially eclipsed as it enters partly into the shadow of the earth. This will not be visible at all in the United States, but may be observed from Asia, the Indian Ocean, the Pacific Ocean and Antarctica.

Second Eclipse of Year

Two weeks later, on May 8 and 9 (since it occurs on both sides of the International Date Line) the year's second eclipse occurs—one of the sun. Though the moon will come squarely between sun and earth, the moon's distance will be rather greater than average and so its apparent diameter in the sky will not be as great as that of the sun. Hence, the sun will not be completely covered. Even where the eclipse can be seen best, a ring of solar surface will remain visible around the dark disk of the moon. Such an eclipse is called "annular," from the Latin word for a ring. This will be seen along a path over the Indian Ocean, Siam, Indo-China, the China Sea, Japan and the Pacific Ocean. A larger area around the path will see the sun partially eclipsed by the moon.

On Nov. 1 comes the third eclipse of the year, a total one of the sun. But the region where it is visible is along a path over Africa, the Indian Ocean and the waters south of Australia, an inaccessible region to which few if any astronomers will go for the purpose of making observations.

The new year will also bring a comet that is visible to the naked eye. Bester's comet, discovered by a South African

astronomer of that name in September, 1947, according to early calculations, may reach a magnitude of about 2.5 at the end of February. This is well above the 6th magnitude usually taken as that of the faintest star visible to the unaided eye.

Diffuse Patch of Light

However, the comet is a diffuse patch of light and not nearly as easily located as a star of the same brilliance. Furthermore, when it is brightest, it will be too nearly in the direction of the sun to be located. Around the middle of March it will travel across the northern sky, passing near the star Altair, in Aquila, the eagle, and then near Vega, in Lyra, the lyre. These constellations, at that time of year, will be visible in the east in the early morning hours, and by then the comet will be considerably fainter. Thus, it seems most unlikely that Bester's comet will rival Halley's and other famous naked-eye comets of the past.

Time Table for January

Jan.	EST	
2	1:00 a. m.	Sun nearest earth; 91,446,000 miles
3	6:13 a. m.	Moon in last quarter
3	8:00 a. m.	Mercury beyond sun
8	8:56 a. m.	Moon passes Jupiter
11	2:44 a. m.	New moon
13	1:00 a. m.	Moon farthest, 252,570 miles
19	11:25 p. m.	Moon passes Venus
19	6:32 a. m.	Moon in first quarter
26	2:11 a. m.	Full moon
	6:00 a. m.	Moon nearest; 221,490 miles
	11:39 p. m.	Moon passes Saturn
28	12:34 a. m.	Moon passes Mars

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, December 27, 1947

One job of the astronomer is to study the atmospheres of the other planets to determine their chemical composition and extent.

A record parachute drop was made when one carrying scientific instruments was released from a rocket at an elevation of 59 miles.

PHARMACOLOGY

New Poison Antidotes

There is a possibility that the new hayfever medicines, such as benadryl, pyribenzamine and others may act as antidotes to curare and certain other poisons.

► THE possibility that the new hayfever medicines, benadryl, pyribenzamine, neo-antergan and others, may act as antidotes to certain poisons was suggested by the French scientist who discovered the mother substances of these modern hayfever medicines.

He is Dr. Daniel Bovet, now at the Instituto Superiore di Sanita in Rome, but for about 20 years the only pharmacologist at the Pasteur Institute in Paris. While there he not only discovered the first of the anti-histamine chemicals which relieve hayfever and hives, but with Drs. E. Trefonel and F. Mitti discovered that sulfanilamide is the active part of the original German prontosil. The whole development of the sulfa drugs is based on this discovery.

The South American Indian arrow poison, curare, and certain other poisons and some purgatives, he reported, appear to act in the body by liberating histamine. The new hayfever drugs are noticeably antagonistic to the action of these poisons as well as to histamine. Study of the poisons mentioned, he pointed out, has opened up an interesting and so far little explored field.

Relative newcomers to the hayfever drugs of the anti-histamine class are thephorin, described by Dr. C. Lehman of Hoffman-La Roche, Inc., at Nutley, N. J.; antistine, reported by Dr. Rolf Meier of Ciba, Ltd., and the University of Basle, Switzerland; thenylene or histadyl; nepera and rhone poulenc.

All of these and the more familiar benadryl, pyribenzamine and neoantergan have about the same pattern of action, Dr. Samuel M. Feinberg of Northwestern University Medical School stated.

All, with one exception, are local anesthetics. All show their greatest effect on hives and other forms of itching skin. They are about equally effective in relieving the sneezing and other symptoms of hayfever, including the kind that may come at non-hayfever seasons. None of them is very effective in asthma.

All have about the same undesirable effects, including that of causing sleepiness with lassitude, weakness and inability to concentrate. Dizziness and

nervousness are other common undesirable effects.

Curiously, these drugs not only vary somewhat between themselves in their effects, but they also vary in the response of the patient. That is, one with the highest sleepiness effect in general may cause less sleepiness in some individuals.

Science News Letter, December 27, 1947

MICROSCOPY

New Lens Magnifies Virus 200,000 Times Actual Size

► VIRUSES no longer are protected by their infinitesimal size because a new "double lens" has been experimentally developed for use with the electron microscope, which provides an extraordinary degree of light contrast and detail at magnification from 200,000 to 300,000 times actual size.

The importance of this new experimental lens not only in the study of virus infections but in enzyme action and even cancer, was reported jointly by Dr. James Hillier and S. G. Ellis, of the RCA Laboratories, Princeton, N. J., at the first international conference of the Electron Microscope Society of America, at the Franklin Institute in Philadelphia.

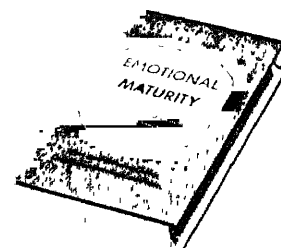
In addition to the high magnification viewer, a deflection focusing system was also developed. Its simplicity was emphasized by the scientists by comparing it to a range-finder on a conventional camera. The electron microscope specimen is alternately illuminated from two directions giving two images if it is out of focus. Even an inexperienced operator can obtain a clear image by adjusting the focusing control until the two images are accurately super-imposed.

A leak detector for vacuum equipment was demonstrated for the first time by Herbert Nelson of the RCA Victor Division, Harrison, N. J., before the same meeting. It is portable and sniffs out leaks so small that molecules of air have trouble squeezing through in such devices as the electron microscope, electron tubes, X-ray tubes, cyclotrons and vacuum stills.

Science News Letter, December 27, 1947



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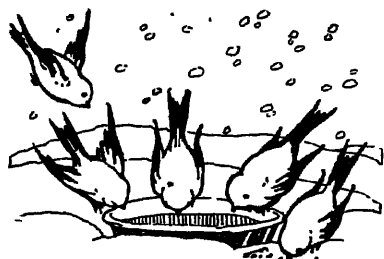
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ORNITHOLOGY

NATURE RAMBLINGS

by Frank Thone



Bounty for the Birds

➤ CHRISTMAS giving, it is pretty generally agreed, should not be confined to one's kinsfolk and closest friends. In times like these, when so many of our unknown neighbors are needy, our bounty must overflow the boundaries of our immediate acquaintanceship.

It may require a little sacrifice to bring a measure of Christmas cheer to our hard-pressed human neighbors, but it costs us practically nothing at all to distribute largesse to our lesser brothers, the winter birds. They will be glad of the crumbs from the table, or scraps of suet trimmed from a roast before it is put into the oven. A simple pan of water, warmed up to the temperature of good hot coffee so that it will not freeze so quickly, will be high wassail for them.

Birds will accept your gifts gratefully even if they are only tossed out onto the ground or the crusted surface of frozen snow. It is better, though, to provide some kind of feeding tray, preferably in some corner with shelter from the wind, and as well as possible out of the reach of prowling cats. Food on such a tray will not be wasted through scattering or by burial in loose snow.

Suet is especially prized by birds. It is one of the best of fuel-foods, to keep their small bodies warm against the

cold to which they are always exposed even on relatively good winter days. This also should be secured in some way to prevent a whole lump from being carried off and monopolized by one greedy individual. Squirrels, fond of suet, too, and will steal the birds' supply if they get a chance.

Many persons make a kind of suet pudding by melting the suet, adding raisins, cracked grain and other things that birds like, and pouring the mixture into a half-coconut-shell or some other container to harden. Hung up on a wire, this is difficult for squirrels to get at, and no bird can get more than a fair beakful at a time.

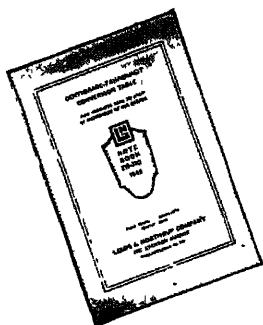
A much simpler suet-holder can be made of an old-fashioned wire soap-dish. This can be hinged against a tree trunk with a couple of staples or bent-over nails, with another bent nail on the other side left free to turn as a latch. Birds are able to peck out the suet through the meshes, but squirrels find the cage completely inaccessible.

Science News Letter, December 27, 1947

NUCLEAR PHYSICS

Giant Magnet Assembled

Constructed for the new 400-million-electron-volt synchro-cyclotron at Columbia University, it promises to answer many questions about the atom.



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➤ A GIANT magnet, constructed of more than 2,000 tons of steel with miles of copper coils, was assembled at Irvington-on-Hudson, New York. It promises to lead to new facts about the atom and possible new weapons against cancer.

The magnet is for the new 400-million-electron-volt synchro-cyclotron at Columbia University's nuclear physics research center on Nevis, an estate given to the university a dozen years ago by Mrs. T. Coleman duPont. Completion of the new scientific tool for probing atomic forces is scheduled for next summer. Built in cooperation with the Navy through the Office of Naval Research, it will be one of the mightiest atom-smashers in the world.

Tiny charged particles, travelling a hundred miles between source and target in the new instrument, are expected to answer some of the fundamental questions about the structure of matter. Dr. John R. Dunning, scientific director

of the project, predicted that the new high-power bombardment of the atom may produce "new isotopes which have never been studied before and which will probably have interesting properties from both the physical and chemical standpoint.

"Such information should go a long way to clear up the principles of nuclear structure," he explained.

Declaring that "the Columbia cyclotron at Nevis may open a new frontier in physics," another university scientist, Nobelist I. I. Rabi, suggested that a new attack on malignant tissues such as cancer in the body might be made with the atom-smasher.

The physicist said that highly penetrating protons, near the end of their range in the new instrument, could be used to bombard affected areas deep in the body without great damage to healthy tissue. This would be possible because the particles produce more ionization as they slow down.

Science News Letter, December 27, 1947

Books of the Week

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AN APPROACH TO RADIO—J. B. Shrewsbury—*Electronic Industries*, 288 p., illus., \$4.50. A practical guide for the beginner.

DAWN OF CREATION—J. Carroll Mansfield—*Lothrop, Lee and Shepard*, 238 p., illus., \$2.75. The story of the earth and life on it—from the origin of our solar system to the rise of civilization—told for younger teen-agers.

DESERT ANIMALS—Rita Kassin—*McKay*, 28 p., illus., \$2.50. An attractive book, in colored pictures and verse, for the very young reader.

DESERT PARADE—William H. Carr—*Viking*, 96 p., illus., \$2.50. A copiously illustrated guidebook to the plants and animals of the southwestern United States.

ELEMENTS OF ACOUSTICAL ENGINEERING—Harry F. Olson—*Van Nostrand*, 2nd ed., 539 p., illus., \$7.50.

EMOTIONAL MATURITY. Development and Dynamics of Personality—Leon J. Saul—*Lippincott*, 338 p., \$5.00. A basis for the understanding of neuroses and the atomic age through better knowledge of the loves, hates, desires and fears of men.

FISHES OF THE GREAT LAKES REGION—Carl L. Hubbs and Karl F. Lagler—*Cranbrook Inst.*, Bulletin No. 26, 186 p., illus., \$3.00. An expanded version of "The Fishes of the Great Lakes and Tributary Waters," this descriptive handbook has pictures and color plates to aid in identification of the species.

THE GIFTED CHILD GROWS UP—Lewis M. Terman and Melita H. Oden—*Stanford Univ.*, 448 p., \$6.00. Vol. IV of the "Genetic Studies of Genius" considers the physical, professional, marital, educational and financial status of Terman's original group of "1,400 gifted children" at average age 35.

GROWTH REGULATORS: A Practical Handbook—John W. Mitchell and Paul C. Marth—*Univ. of Chicago*, 129 p., illus., \$2.50. Describes the various uses of plant

hormones in weed control, plant growth, and storage of plant products.

HEALTH INSTRUCTION YEARBOOK, 1947—Oliver E. Byrd—*Stanford Univ.*, 325 p., \$3.00. Current information digested from 1947 literature on all phases of health, and chaptered according to subject matter.

HORMONES AND HORTICULTURE—George S. Avery, Jr., Elizabeth B. Johnson, et al.—*McGraw-Hill*, 326 p., illus., \$4.50. Addressed to those engaged in plant growth or research, this book summarizes available information, giving specific applications for plant growth control.

INTERTONGUING MARINE AND NONMARINE UPPER CRETACEOUS DEPOSITS OF NEW MEXICO, ARIZONA, AND SOUTHWESTERN COLORADO—William S. Pike, Jr.—*Geol. Soc. of Am.*, Memoir 24, 103 p., illus., \$2.25.

THE LIFE AND TIMES OF TYCHO BRAHE—John Allyn Gade—*Princeton Univ.*, 209 p., illus., \$3.50. A well-written account of the life and works of this 16th century astronomer.

MENTAL HYGIENE—Herbert A. Carroll—*Prentice-Hall*, 329 p., \$5.00. An elementary text, for college students, on the dynamics of personal and social adjustment.

PHYSIOLOGICAL AND PSYCHOLOGICAL FACTORS IN SEX BEHAVIOR—S. Bernard Wortis, et al.—*N. Y. Acad. of Sci.*, Vol. XLVII, Art. 5, 62 p., paper, \$1.25.

PRELIMINARY LIST OF THE BIRDS OF MARYLAND AND THE DISTRICT OF COLUMBIA—Irving E. Hampe and Haven Kolb—*The Nat. Hist. Soc. of Md.*, 76 p., illus., paper, \$1.00.

TEACHING PSYCHOTHERAPEUTIC MEDICINE

MEDICINE

BAL Restores Eyesight

➤ A PATIENT whose eyesight was damaged by arsenic has had his vision restored by treatment with BAL, anti-war gas chemical which has saved lives and health of patients poisoned by arsenic, mercury, gold and lead.

This latest use of BAL, and the first in which it restored eyesight, is reported by Dr. Sidney Friedenbergh of Camden, N. J., in the *Journal of the American Medical Association* (Dec. 20).

The patient was a 49-year-old man who was losing his eyesight because of damage to the optic nerve from arsenic. The arsenic was given him in the form of tryparsamide for treatment of syphilis. Two days after the second dose of this standard anti-syphilis drug, he could not see the sidewalk when walking.

BAL was started at once and was

—Helen Leland Witmer, ed.—*Commonwealth Fund*, 463 p., \$3.75. Textbook based on a postgraduate course in psychotherapy and the means of applying it in general medical practice.

THE RELATION OF DISEASES IN THE LOWER ANIMALS TO HUMAN WELFARE—William A. Hagan, et al.—*N. Y. Acad. of Sci.*, Vol. XLVIII, Art. 6, 125 p., paper, \$2.50.

RECONNAISSANCE GEOLOGY OF PORTIONS OF VICTORIA ISLAND AND ADJACENT REGIONS ARCTIC CANADA—A. L. Washburn—*Geol. Soc. of Am.*, Memoir 22, 142 p., pictures unpaginated, illus., \$4.00.

THE SCIENCE AND ENGINEERING OF NUCLEAR POWER—Clark Goodman, ed.—*Addison-Wesley*, \$7.50. Based on a series of seminars at the Massachusetts Institute of Technology in October, 1946, this book presents the underlying principles of chain-reacting systems and industrial applications of nuclear energy for the non-specialist.

SOME ASPECTS OF RED CELL PRODUCTION AND DESTRUCTION—Eric Ponder, et al.—*N. Y. Acad. of Sci.*, Vol. XLVIII, Art. 7, 125 p., paper, \$2.00.

TOM EDISON Boy Inventor—Sue Guthridge—*Bobbs-Merrill*, 200 p., illus., \$1.75. Biography of the early life of Edison, in convenient large print for young readers.

UNIPOLAR LEAD ELECTROCARDIOGRAPHY—Emanuel Goldberger—*Lea and Febiger*, 182 p., illus., \$4.00.

WEATHER ELEMENTS—Thomas A. Blair—*Prentice-Hall*, rev. ed., 401 p., illus., \$5.65. Principles and facts, intended to convey an elementary understanding of physical processes basic to weather phenomena, observation methods and instruments are also considered.

WOMEN DOCTORS TODAY—Sally Knapp—*Crowell*, 184 p., illus., \$2.50. Twelve biographies of women physicians and their varied work in modern medicine.

Science News Letter, December 27, 1947

YOUR HAIR AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as Dandruff — gray hair — thinning hair — care of the scalp — baldness — abnormal types of hair — excessive oiliness — brittle dryness — hair falling out — infection — parasites — hair hygiene, etc., etc.

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given by injection every day for 10 days. Nine days later his vision was normal.

Damage to the optic nerve by tryparsamide therapy has occurred previously in the course of syphilis treatment. In the early stages this damage and loss of vision is only temporary but in later stages it may be permanent.

"In this patient," Dr. Friedenbergh reports, "the unusually rapid return of vision was probably due to the prompt use of BAL following his visual complaints."

The word BAL, stands for British Anti-Lewisite, its chemical name is 2,3 dimercaptosuccinic acid. It was developed by the British to counteract the war gas, Lewisite, which owes its poisonous action to the arsenic it contains.

Science News Letter, December 27, 1947

• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 394. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

☼ **FIRE-RESISTANT YARN**, suitable for automobile seats and similar uses, is also self-extinguishing, and immune to oil, grease, and mild acids, it is claimed. It is also said to be fade-proof, colorfast, waterproof, and will not rot. Similar yarn for tablecloth is under development.

Science News Letter, December 27, 1947

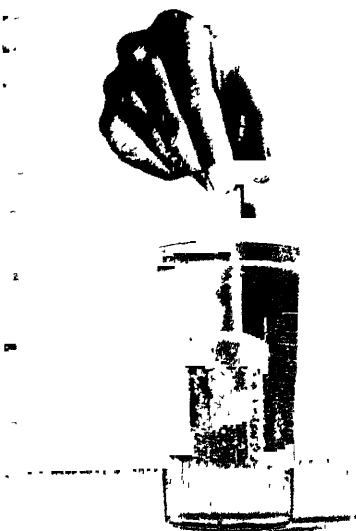
☼ **CRITICISM BOARD** for public speaking, recently patented, consists of a box in front of the speaker with electric signs visible to him which may be flashed on and off by a critic in the audience. The one-word signs include such expressions as posture, force, pitch, emphasis and gesture.

Science News Letter, December 27, 1947

☼ **X-RAY PHOTOMETER** is an electrical instrument capable of providing a continuous analysis of flowing streams of fluids and gases by measuring and comparing X-ray absorption of a sample and a standard. It gives an economical and rapid means of making chemical comparisons.

Science News Letter, December 27, 1947

☼ **HEATER AND STIRRER** is a small instrument to insert in a beverage, as shown in the picture, which contains a cartridge-like heating charge, and the stirrer. Spring action sets the chemical heat charge when the handle is pulled



back and released. Heating is without fumes or odor, refills are available.

Science News Letter, December 27, 1947

☼ **SAND SPREADER**, to distribute sand on slippery ice near the home, is a canvas container with a long pouring neck and convenient handles. It is sturdily constructed, holds 25 pounds of sand, and has a tie-string to keep the contents from leaking when the device is not in use.

Science News Letter, December 27, 1947

☼ **HUMIDITY INDICATOR** provides readings of relative humidity accurate

within one percent for general conditions. The instrument, with dry and wet bulb thermometers in one housing, has a simplified slide rule calculator on the front to give direct humidity readings.

Science News Letter, December 27, 1947

☼ **ELECTRIC DEVICE**, improved type for predicting with greater speed and accuracy the behavior, reactions and properties of chemical substances, is described as a calculator to compute molecular vibration frequencies. The device, called a potentiometric equation computer, is primarily for research laboratories.

Science News Letter, December 27, 1947

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Question Box

AERONAUTICS

What is Skyway Eleven? p. 403.

SCIENCE

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